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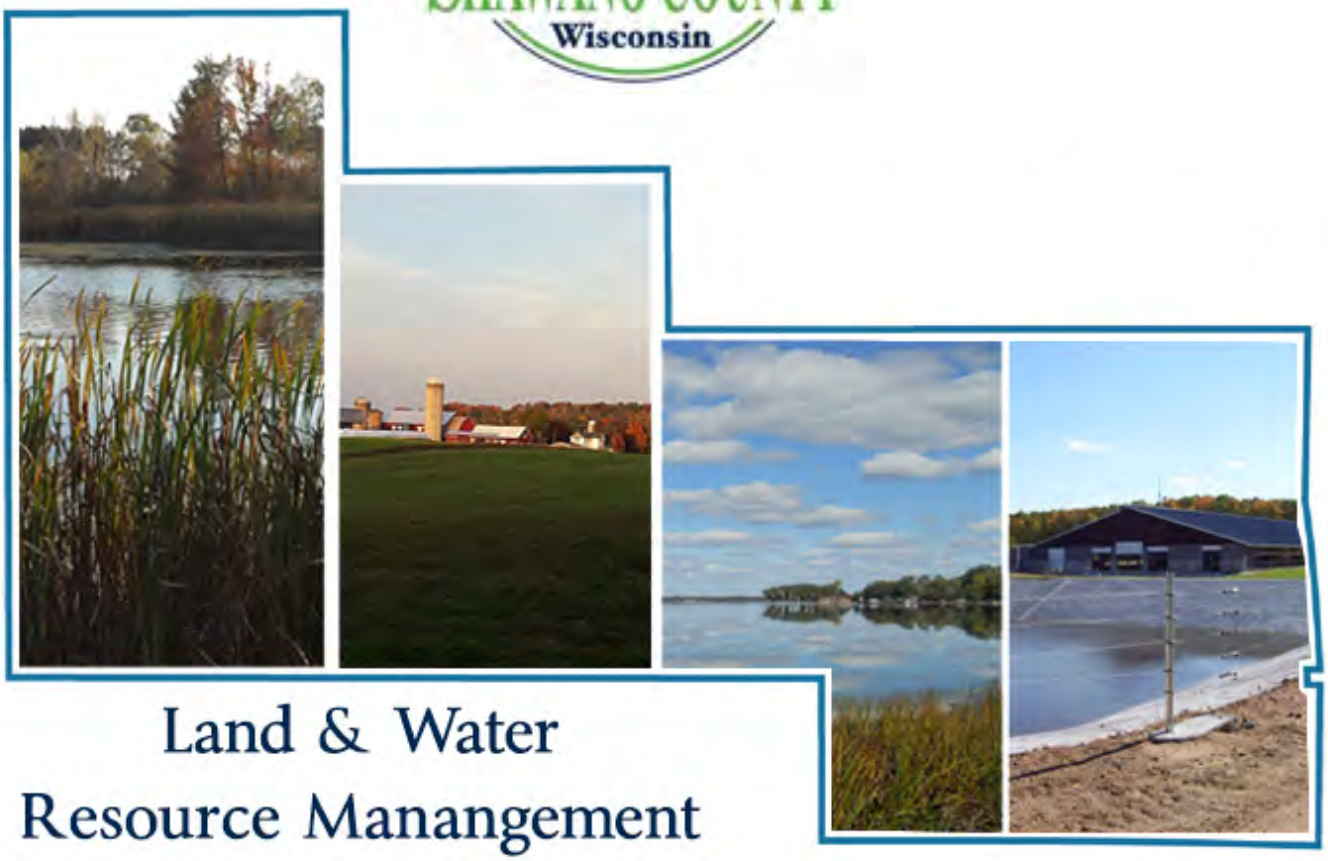

Land & Water Resource Manangement Plan

February 2016

Shawano County
Land and Water Resource Management Plan

February 2016

Shawano County
Land Conservation Committee

Kathy Luebke – Chairman
Marvin Klosterman – Vice Chairman
Randy Young – Secretary
Robert Krause – Member
Arlyn Tober – Member
Alan Tauchen – Member (appointed by FSA)

County Conservationist
Scott M. Frank

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Plan Summary

The purpose of this plan is to establish a process that will ensure local decision making, increase program delivery mechanisms and utilize local, state and federal funds with greater effectiveness toward the protection of land and water resources. This 10 year plan was developed in accordance with the requirements in Chapter 92 of Wisconsin Statutes and has been organized into the following chapters:

Chapter 1 – Plan Development and Public Participation
Chapter 2 – County Setting, Assessment of Water Quality and Resource Conditions
Chapter 3 – Performance Standards and Prohibitions
Chapter 4 – Goals, Objectives and Actions
Chapter 5 – Regulations for Plan Implementation
Chapter 6 – Information & Education Strategy
Chapter 7 – Coordination
Chapter 8 – Monitoring and Evaluation
APPENDICES - A: Glossary
- B: Best Management Practice Definitions
- C: Maps
- D: Public Hearing Notice

Chapter 1. Plan Development and Public Participation
This chapter details the reasons and process of developing the Shawano County Land and Water Resource Management Plan. The members of the County Land Conservation Committee and the staff of the Land Conservation Department (LCD) place a very high value on the guidance and insight they receive from citizens, organizations and representatives from other agencies and units of government. Previous Shawano County Land & Water plans were the foundation of this plan. Assisting in the development of this plan was a Citizen Advisory Committee that included a variety of natural resource professionals, county committee members and interested citizens representing riparian owners, farming and conservation.

The Shawano County Land Conservation Committee held a public hearing on January 7, 2016 which was preceded by a published class II notice.

A presentation of the plan was given to the Wisconsin Land and Water Conservation Board (LWCB) on February 2, 2016.

This Land and Water Resource Management Plan was reviewed and approved by the Shawano County Board of Supervisors on _____, 2016.

An order letter was issued on _____, 2016 from WI Department of Agriculture, Trade and Consumer Protection (DATCP) adopting the plan.

Chapter 2. County Setting, Assessment of Water Quality and Resource Conditions
This chapter provides an overview of Shawano County including some general characteristics, a historical timeline, natural resources, land use trends, soil loss and land & water resource conditions in each watershed.

Chapter 3 – Performance Standards and Prohibitions
Chapter NR 151 Wisconsin Administrative Code sets forth state minimum performance standards and prohibitions for farms and urban areas. This chapter lists them and details implementation of the performance standards and prohibitions which were designed to achieve water quality standards by limiting nonpoint source water pollution.

Chapter 4 – Goals, Objectives and Actions
This chapter covers the overall goals, objectives and strategies to implement during the plans' ten year timeframe. They were developed based on recommendations of the Citizen Advisory Committee, technical advisors and analysis of existing conditions in Shawano County. A Work Plan, in table format, lists the specific goals, objectives, strategies, activities, measurable outcomes with some target benchmarks and responsible party. The Work Plan is a working document that will have local review annually for progress and revised as needed. After five years, a scheduled review and update of this plan will occur with DATCP and LWCB. An implementation budget estimate for the Work Plan is included at the end of the chapter.

Chapter 5 – Regulations for Plan Implementation
This chapter identifies state and local regulations important for the protection of natural resources to be utilized for plan implementation. The Shawano County Livestock Waste Management Ordinance has provisions for Livestock Siting and incorporated some of the state performance standards and prohibitions.

Chapter 6 – Information and Education Strategy
This chapter discusses the importance of the Information & Education component to the success in reaching the plan goals and objectives. Throughout the Work Plan specific areas and activities have been identified on which topics education is needed in the community. Local partnerships are necessary in order to provide the greatest reach throughout the county.

Chapter 7 – Coordination
Managing the county's natural resources is a team effort, and we rely on many partners for assistance and support. The goals, objectives, strategies and activities outlined by this plan will be achieved primarily though integrating them with continued or enhanced implementation of available local, state and federal programs. This chapter identifies those programs along with how and where they may be utilized.

Chapter 8 – Monitoring and Evaluation
To ensure the success of the Land & Water Resource Management Plan, regular evaluation is important. This plan is a working document that will be reviewed annually to track progress in accomplishing the goals, objectives and activities in the Work Plan. Areas discussed include: Performance Standards and Prohibitions Monitoring, Pollutant Load Reduction Measurements, Administrative Reporting, Water Resource Monitoring and I & E Evaluation.

Chapter 1 – Plan Development and Public Participation

Public and political demands have changed the approach in the ongoing battle for improvement and protection of land, water, and related natural resources in Wisconsin. This is particularly true of the Nonpoint Source Pollution Abatement Program. In response to the call for a "redesign" of the Nonpoint Program, the Wisconsin Legislature has created a Land and Water Resource Management Planning Program. 1997 Wisconsin Act 27 and 1999 Wisconsin Act 9, amending Chapter 92 of Wisconsin Statutes was the enabling legislation for the development and "official" recognition of County Land & Water Resource Management Plans. This is the process that provides for a comprehensive analysis of countywide land and water resource issues and needs. County Land Conservation Committees and their Land Conservation Departments are an integral part of this process. Shawano County considers this as an opportunity to strengthen landowner participation, improve program effectiveness and increase coordination with other cooperating 'partners' involved in natural resource management.

The purpose of this plan is to establish a process that will ensure local decision making, increase program delivery mechanisms and utilize local, state and federal funds with greater effectiveness toward the protection of land and water resources. In developing this Land & Water Resource Management Plan it was important to review past goals and objectives identified through similar efforts that were based on extensive public participation. It is equally important to recognize that most of the resource issues and concerns that have been identified in the past are still with us. The magnitude and scope of those issues and concerns may have changed, but the hard fact is they still exist. As our population increases, so do the demands and pressures on our resources. Our challenge is to make the right decisions and take the necessary actions in order to reach and maintain a critical balance between societal growth, without destroying our natural resources.

Shawano County first developed a Land & Water Resource Management Plan in 2000 and completed updates in 2004 and 2009. This Land & Water Resource Management Plan is an improved and updated guide that builds upon past works in order to help carry out a true integrated process. It also serves to complete needed watershed based nonpoint source pollution abatement in Shawano County during the next 10 years.

Local Advisory Committee & Adoption

The members of the County Land Conservation Committee (LCC) and the staff of the Land Conservation Department place a very high value on the guidance and insight they receive from citizens, organizations, and representatives from other agencies and units of government. Prior planning efforts (1999, 2004, and 2009) included a Citizen Advisory Committee and a Local Work Group. For this plan update these two entities were combined and was called the Land & Water Plan Citizen Advisory Committee. The Citizen Advisory Committee was made up of representatives from the local Land Conservation Department, Land Conservation Committee, Planning & Zoning Committee, County Planning and Development Department, Department of Natural Resources, University of Wisconsin Extension, United States Department of Agriculture – Natural Resource Conservation Service, United States Department of Agriculture – Farm Service Agency Committee, Shawano Area Waterways Management, Stockbridge-Munsee Tribe and Caroline Conservation Club. They were as follows:

CITIZEN ADVISORY COMMITTEE

Scott M. Frank	Land Conservation Dept.
Christa Hoffman	Planning, Development & Zoning Dept.
Jamie Patton	UWEX Agricultural Agent
Erin E. Hanson	DNR Nonpoint Source Coordinator
Sherrie Zenk-Reed	NRCS Tribal Liaison
Kathy Luebke	Land Conservation Committee
Randy Young	Land Conservation Committee
Marlin Noffke	Planning, Development & Zoning Committee
Al Tauchen	LCC and USDA - Farm Service Agency – Shawano
Ray Zuelke	Shawano Area Waterways Management
Randall Wollenhaup	Stockbridge-Munsee Tribe – Wildlife Biologist
Todd Malueg	Caroline Conservation Club

The Land & Water Plan Citizen Advisory Committee (LWPCAC) met three times (5/19/15, 7/21/15, and 8/25/15). This committee utilized a 10 year planning timeframe while reviewing the Plan and making recommendations for updating goals, objectives and actions. A public hearing on the Plan was held on January 7, 2016 at the Shawano County Land Conservation Committee meeting. See copy of public hearing notice in Appendix D. The Land Conservation Committee approved the Plan and recommended forwarding it on to the state Land and Water Conservation Board (LWCB) for review at their February 2, 2016 meeting. The Plan will be presented to the Shawano County Board of Supervisors at their February 24, 2016 meeting.

Public Opinion

The 2009 Land & Water Resource Management Plan update coincided with creation of the Shawano County Comprehensive Plan which was adopted by the County Board January 29, 2009. As a result of the input from the general public through surveys, focus groups at informational meetings and public hearings for the Comprehensive Planning process it was quite obvious that the people of Shawano County care about the natural resources but also value their independence and private property rights very highly. It is critical to balance both of these aspects in order to have new rules accepted. One of the overall county Comprehensive Plan goals is to "Preserve and enhance the County's natural features, including lakes, rivers, forests, wetlands, wildlife habitats, open spaces and groundwater resources".

The Shawano County Farmland Preservation Plan was updated and re-certified in 2013 and integrated into the Shawano County Comprehensive Plan. As a result of the input from the general public through town focus groups, informational meetings and public hearings for this planning process it was quite obvious that the people of Shawano County care about agriculture and forestry. A primary goal is to "Preserve large tracts of contiguous productive crop, pasture, and forest land, and farming and forestry as a central component of Shawano County's economy and way of life". Shawano County's working lands define not only the economy of the area, but the heritage and lifestyle of many parts of the County. Preserving agricultural land uses and a rural way of life are important components of the future vision for the County.

The general public was provided opportunities to comment on the Plan. There were no written or oral comments given at the public hearing held on January 7, 2016.

Related Resource Management Plans

In developing this Land and Water Resource Management Plan, issues, concerns, needs, goals and objectives from many existing natural resource management plan documents were reviewed. All of those documents are listed in the References section of this Plan. There are a number of key documents with specific data, observations and objectives that served a larger role as they relate to this Plan. These include:

- Shawano County Comprehensive Plan (2013)
- Shawano County Farmland Preservation Plan (2013)
- Shawano County Forest Stewardship Management Plan (2013)
- Shawano County Invasive Species Strategic Management Plan (2013)
- Upper Green Bay Basin Integrated Management Plan (2001)
- State of the Wolf Basin Report (2001)
- Pensaukee River Priority Watershed Plan (1997)
- Shawano County Erosion Control Plan (1987)
- Shawano County Animal Waste Management Plan (1985)
- Shawano County Long Range Resource Conservation Plan (1979)

It is important to recognize that these documents were developed with a great deal of public participation. Many of the concerns, ideas, and recommendations voiced by those people are incorporated in this document.

Basin Team Coordination

In each basin (Upper Green Bay and Wolf River) the DNR had established Partner Teams comprised of representatives from sporting groups, local governments, Conservation Congress, environmental groups, etc. These Partner Teams were created to foster collaborative thinking and management of each basin's resources.

The Department of Natural Resources is also responsible for creating a Basin Plan for each basin in the state. A new basin plan development process has been created that provides an analysis of the current status of resources in each basin (state of the basin report). The county has every intention of protecting and improving resources as a means to help meet the goals of these respective basin plans. Available basin plan information has been reviewed to ensure that this resource management plan does not contradict those efforts. It is our belief that our ongoing efforts to protect and improve our resources will help us all reach our mutual goals.

Partnership Team and Basin Priorities

Upper Green Bay Basin:
The Upper Green Bay Basin Partnership Team is currently composed of fifteen members. First convened in October of 1998 the Team has identified and prioritized the present and future threats to the natural resources of the basin. Facilitated sessions were conducted to complete this task and forty issues were listed. A voting process was undertaken to select the top ten. The top ten are listed below.

1. Shoreline Development
2. Non-Point Source Pollution and Resource Education (tied)
3. User Conflicts

4. Special Interests, Money and Politics
5. Habitat Loss and Fragmentation of Habitat
6. Retaining the Rural Character of the Northwoods
7. Impacts of Human Population Growth
8. Industrial and Municipal Discharges to Surface Waters
9. Inadequate Zoning and Zoning Enforcement
10. Lack of Comprehensive Land Use Planning and Mechanisms to Guide implementation

Wolf River Basin:
Priorities for action have been identified by both the WDNR and its partnership team. The partnership team has identified four main priorities or issues of concern along with a series of recommendations. The four priority areas are:

1. Water Pollution
2. Loss of Shoreline Habitat
3. Hunting, Fishing, Trapping and Recreational Uses
4. Need for an Inventory of Basin Resources

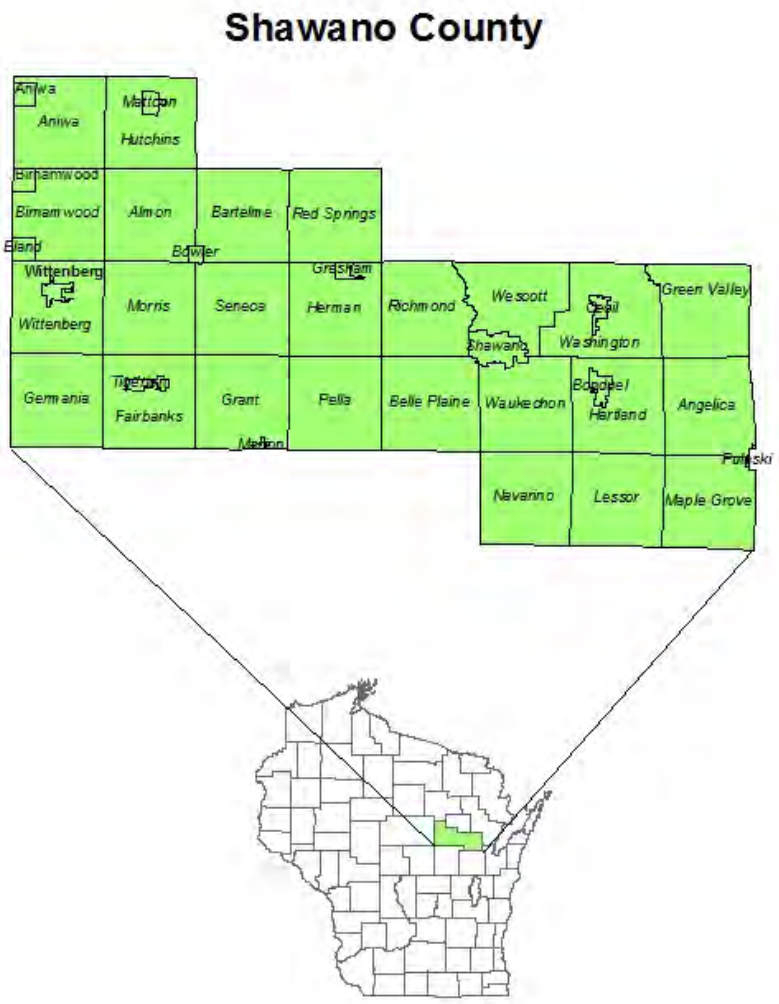
The DNR Wolf Basin Team shares these concerns and has identified its own top priorities as well:

1. Preservation and protection of wetlands
2. Preventing the introduction and reducing the spread of invasive exotic species
3. Pressures from development
4. Land use and 'Smart Growth'

Chapter 2 – County Setting, Assessment of Water Quality and Resource Conditions

General Characteristics

Shawano County is situated in northeast Wisconsin. It covers approximately 933 square miles with an actual land area of about 910 sq. miles. There are about 14,125 acres of surface water. The majority of population and industry is located in the central portion of the county in and around the City of Shawano and Shawano Lake.



Shawano County's population has increasing steadily with a current population of 41,949 residents. The majority of the population is concentrated in the city of Shawano (county seat) and the surrounding towns of Belle Plaine, Richmond, Wescott and Washington. The county has 25 civil towns and most of them have predominant rural/agricultural characteristics.

Shawano County Census Data

Year	Population
1980	35,928
1990	37,157
2000	40,664
2010	41,949

Dairy farming and beef livestock operations are the main agricultural activities with some cash grain and vegetable growing operations becoming more apparent. Lumber and lumber product manufacturing is the principal industrial activity of the county although many diversified manufacturing and service industries are prevalent.

History

For centuries, prior to the European settlement, the area that is now Shawano County was inhabited by American Indians. These people were of the Menominee tribe. They pursued a nomadic life of hunting, fishing, gathering and rudimentary agriculture. The lakes, rivers, and adjacent marshes provided abundant supplies of fish, waterfowl, other wildlife species and wild rice. The name "Shawano" was derived from the Menominee word "Shaw-an-aw" which means south and was originally applied to Shawano Lake.

The area's waterways provided an ideal transportation system for the Indians. This system would eventually be used by French traders, missionaries, fur traders, and then American settlers. The early history and development of the county was centered on its water resources as transport for the pine logs to the Fox Valley and local saw mills. A brief historical outline:

1840's – 1850's - Shawano County was first surveyed. The blazed section lines and corner posts aided the early timber cruisers and settlers in the orderly identification and transfer of land. The notes from this first survey also described the landscape of the time. Both natural resources such as soils and vegetation plus cultural improvements were described.

1843 – Samuel Farnsworth paddled up the Wolf River to the Shawano Lake Outlet. Here he met helpful Menominee's who had a village at this location. The following year Farnsworth sent his agent Charles Wescott to start a lumbering venture and saw mill.

1870's – 1880's – Intense logging operations soon depleted the pine adjacent to the Wolf River and other means of transportation were sought to transport hemlock and hardwoods, which did not float well to the Fox Cities. In 1884 the St. Paul and Eastern Grand Trunk Rail Road was built from Oconto to Clintonville. This was the first railway to run through Shawano.

1890's – Agriculture and lumber manufacturing plants evolved. In 1896 the *Shawano County Advocate* reported that 1,740 acres were in barley and hay; 2,409 acres were in potatoes, beans, peas and apples; 11,937 acres in wheat; 5,374 acres in corn; and 2,565 acres in oats and rye. It also reported that there were 14 cheese factories and four creameries showing that dairy farming was becoming an important industry. Tourism and outdoor recreation also started to develop especially in the vicinity of Shawano Lake and the Cloverleaf Lakes around the turn of the century.

1920's – After the "War to end all wars" the nation concentrated on its transportation highway system by paving to make roads passable during all seasons to motorized traffic and using a highway numbering system so travelers knew where they were going.

1930's – Economic depression and draught affected Shawano County along with the rest of the nation and much of the world.

1945 – The Shawano County Soil & Water Conservation District (now the Land Conservation Committee and Division) was established by County Board resolution.

1960's – Land use planning and zoning were developed and put in place by the County to organize and direct the future growth of the area in an orderly and beneficial manner. Twenty of the twenty-five towns in the County adopt the zoning and the program takes effect.

1970's & 1980's – With the growth of dairy and other livestock operations emphasis is put on proper manure management. Numerous programs continue to be used to assist farmers with both technical services and cost-sharing for practice installation. The first County Ag Waste Storage Ordinance is passed in early 1984. The County also developed its Ag Waste Management Plan and Soil Erosion Control Plan.

1990's – A big improvement in the transportation system (Highway 29 reconstruction) causes the County Board to foresee a major impact in the area and once again calls for comprehensive land use planning. Hence the beginning of the Land Records Modernization Program in 1992 and establishment of our Planning and Development Department by County Board resolution in 1994. Land use planning via the town and village cluster method with individual municipalities as the base units has enabled local citizens to make decisions affecting the future development of industry, commerce, housing and agriculture.

2000's – The continued residential development of shoreland and stream bank properties led to the Lakes and Streams Classification Project in 2002. The classification may help guide the rewrite of the Shoreland Ordinance after NR115 is amended. Shawano County's Soil & Water Conservation Standards were approved in February, 2005. Trend toward the establishment of large new livestock operations and expansion of existing facilities spurs County in 2006 to develop a comprehensive Animal Waste Management Ordinance to guide the siting of new and expanding operations and establish specifications for construction and management. Changes to the Farmland Preservation Program through the Working Lands Initiative are signed into law in July 2009. Shawano County Comprehensive Plan was prepared in partnership with 26 communities over a three year period and adopted in January 2009.

2010's – Participants of the Farmland Preservation Program are required to meet additional State water quality performance standards and prohibitions beginning in 2010. In 2010, Land Conservation Division was awarded a 3-year Aquatic Invasive Species Education, Prevention and Planning grant. Shawano County adopted an Invasive Species Strategic Management Plan in 2013. The county Farmland Preservation Plan was re-certified by WI DATCP in 2013. The Land Conservation Department was re-established as its own department through a re-organization of the Shawano County Planning and Development Department in 2015. The county Livestock Waste Management Ordinance was amended in 2015 to change its oversite to the Land Conservation Committee and Land Conservation Department.

Natural Resources

Shawano County's landscape is defined by a rich mosaic of farm fields and farmsteads, lakes, streams, wood-lots, wetlands, hills, and other natural features. Residents value the County's natural resources and believe they are critical to ensuring the area's quality of life, recreational opportunities, and economic health. To fully understand the importance of natural resources to Shawano County and the surrounding region, it is essential to recognize that, in addition to the countless environmental benefits they provide, those resources bring in tens of millions of dollars in revenue to local communities throughout the county each year. That revenue comes primarily from the agricultural, wood products, and recreational businesses. While it is difficult to place a specific dollar value on these resources, logic dictates that we absolutely cannot afford to waste them and must do all that we can to conserve them for present and future generations.

Physiography, Relief and Drainage

The entire landscape of Shawano County reflects the influences of glacial activity and is characterized by gently rolling moraines, drumlins, marshes and lowlands. The most recent glacier to cover the county occurred about 10,000 years ago. Within the county there are three major areas with distinct physiographic characteristics.

Major portions of the towns of Wescott, Waukechon, Navarino and Belle Plaine are in a broad, level glacial lake basin. Shawano Lake occupies part of it, and the Wolf River runs through it. In the sandier parts of the basin there is a dune-like topography.

East of the lake basin is an undulating and gently rolling ground moraine with numerous basins and depressions. This area generally slopes to the east, except for a small area that slopes westerly toward the Wolf River. The elevations vary from 1030 feet east of Bonduel to 760 feet where the Oconto River leaves the county.

West of the lake basin the ground moraine continues, but it is interspersed with undulating outwash plains. Much of the outwash is pitted, and this gives the landscape a hilly appearance with many enclosed basins and depressions. The land west of the Wolf River generally slopes to the southeast. The elevation changes from about 1413 feet near Aniwa to about 780 feet where the Wolf River flows out of the county.

About 87.7% of the county lies within the Wolf River watershed. The eastern 12% of the county is drained by streams that empty directly into Green Bay. The extreme northwestern corner, about 0.1% drains into the Wisconsin River watershed.

Steep slopes exceeding a 12 percent grade are found mostly in the western portion of the County (see Map in Appendix C). Generally, slopes of 12 percent grade or greater present some challenges and can result in environmental and property damage due to water runoff, soil erosion and unstable slopes.

Climate

The Soil Survey of Shawano County Wisconsin (1982) states that the seasons vary widely from year to year with considerable variation in temperature and precipitation. The area is under the influence of frequent weather systems that move across the country from west to east.

Total annual precipitation is 30.1 inches, which is usually adequate for most agricultural purposes. Some degree of soil moisture deficiency usually occurs in July and August but severe drought affecting all crops is rare.

Average seasonal snowfall is 46.9 inches. Snow cover usually lasts from late November until the end of March. The growing season averages 131 days but does vary from the Northwest to the Southeast portions of the county. The sun shines 60 percent of the time possible in summer and 40 percent in winter.

Soils

Individual soil types, with specific and unique characteristics, directly influence land uses. Soil type is the primary factor that affects the selection of the types and extent of agricultural practices and management techniques that may be used to sustain high productivity levels. The Shawano County Land Conservation Department extensively uses the soil information and related data in determining cropland soil erosion estimates and sediment load calculations.

There are 90 different soil types found throughout Shawano County. The Shawano County Soil Survey contains detailed descriptions for each soil type, including information on suitability and limitations for various types of land use and land management. These are grouped into eight major soil associations that have distinctive soil patterns, relief, and drainage features. See the General Soils Map in Appendix C for the locations, names and characteristics of these soil associations.

Prime Farmland

The USDA Natural Resources Conservation Service identifies prime farmland soils as those soils with the fewest limitations to produce common cultivated crops and pasture plants without deteriorating over a long period of time. Limitations to agriculture include high erodibility, extreme wetness, low moisture holding capacity and low productivity. The Soil Suitability for Agriculture depicts the locations of Class I, II, and III soils in the County, which are considered “prime farmland” for purposes of this Plan (see Prime Farmland Map in Appendix C). Generally, Class I and II soils are located in highest concentration in the eastern portion of the County. Some Class I and II soil types are also found within the central and western parts of the County. Countywide, 0.1 percent of the lands are Class I soils, 50.5 percent are Class II soils, and 14.1 percent are Class III soils.

Surface Water and Fishery Resources

Shawano County has a varied water resource ranging from trout streams and springs to lakes and streams inhabited by warm water species. Shawano County has 135 lakes and ponds and 595 miles of rivers and streams, including 400 miles of trout streams. Combined, surface water comprises 18 square miles, or roughly 2 percent, of the County’s land. Waterfowl habitat can be considered better than average. Boating opportunities are good. Pollution exists but the waters involved are not beyond redemption.

Most of Shawano County except the eastern side lies within the Wolf River drainage basin (see the Major Basins Map in Appendix C). The Wolf River Basin drains over 3,600 square miles and portions of eleven counties in north-eastern Wisconsin. Nine of the Basin’s 20 watersheds are located at least partially in Shawano County. Currently, this Basin faces many challenges to its overall ecological health, including non-point source water pollution, the loss of shoreland habitats, and the presence of various invasive species. The Wolf River, in Shawano County, is a warm water fishery supporting pan fish and

game fish such as northern pike, walleye, largemouth bass, flathead and channel catfish and several threatened and endangered fish species. The river is also significant for the annual spring sturgeon spawning run from Lake Winnebago to the dam at the City of Shawano. All of the creeks and rivers in the western 2/3 of the county which eventually drain into the Wolf are high quality trout waters and considered exceptional or outstanding waters by the standards in NR 102, Wisconsin Administrative Code. The North Branch plus South and Middle Branches of the Embarrass River, the Pigeon River plus the Red River are all part of this system. The Shioc River also eventually drains to the Wolf from the east, but only the upper 3 miles of the West Branch is considered trout waters. Below that point the Shioc has been affected by the Village of Bonduel's Sewage treatment plant, thermal impacts and the brine overflows from a pickle plant which has just recently been converted to a furniture manufacturing plant. Agricultural drainage has also had an adverse impact on this river.

The Upper Green Bay Basin extends into the Towns of Angelica, Green Valley, Hartland, Maple Grove, and Washington on the far eastern portion of the County. The Suamico River and Pensaukee River Watersheds on the eastern end of the county flow into Green Bay. Both of these systems are warm water fisheries supporting mainly northern pike, forage fish and pan fish in Shawano County. They have been adversely impacted by both agricultural drainage practices, and faulty septic systems. The Oconto River, which crosses through the northeastern corner of the County, is one of the Basin's top three most significant water resources and provides exceptional natural and fishing habitats.

Natural lakes account for about 85% of the lake surface area, while the other 15% are impounded waters. All of the natural lakes are relatively shallow warm water fisheries in the mesotrophic to eutrophic class supporting various game and pan fish populations. Shawano Lake, which is an impoundment, is the most significant in both size (over 6,000 acres) and recreational use (see Surface Water Map in Appendix C).

There is insufficient public owned land adjoining the county's water resources to assure retention of essential fish and wildlife habitat and aesthetic values. The future of the water resource will be dependent upon effective land use planning, education and management techniques.

Healthy Watersheds Assessment

In 2013, DNR partnered with U.S. EPA to develop a model-based assessment tool for all the watersheds in the state. This tool ranks each watershed based on many aspects of watershed condition, including water quality, hydrology, habitat, and biological condition. The assessment results are a modeled prediction of both overall watershed health and vulnerability, which are presented in a series of maps and ranking scores. This information was utilized by the LWPCAC as a tool to help identify HUC 10 watersheds in Shawano County to focus efforts. The county also obtained data on the HUC 12 scale and individual catchment scales and anticipates using it to aid implementation of this plan. It is also expected that this information will be used to help determine sub-watershed(s) to develop future 9 Key Element Plans. The following maps were created by Shawano County staff with data obtained from the DNR in June 2015: Shawano County HUC 10 Watershed – Aquatic Ecosystem Health, Shawano County HUC 10 Watershed – Vulnerability (see Maps in Appendix C).

Impaired Waters

Section 303(d) of the Clean Water Act requires the state to prepare a list of water bodies that are impaired and will remain so even after the application of technology-based standards typically applied to point sources of pollution. The DNR has seven water bodies in Shawano County listed as impaired. The majority of waters are impaired due to high phosphorus levels.

Official Name	Pollutant	Status	Priority
Little Suamico River	Total Phosphorus	303d Listed	Low
Long Lake	Unknown Pollutant	303d Listed	Low
Pensaukee River	Total Phosphorus	303d Listed	Low
Shawano Lake	Total Phosphorus Mercury	Addition 303d Listed	High Low
Shioc River	Total Phosphorus	TMDL Development	High
White Clay Lake	Total Phosphorus	TMDL Development	High
Wolf River	PCBs	303d Listed	Low

Waterways in the Wolf River basin within Shawano County may be important components of waste load allocation schemes and a watershed-based trading program since these lists will eventually be in the National Pollution Discharge Elimination System (point source) permitting program.

Outstanding and Exceptional Resources Waters

Wisconsin classifies many of the state's highest quality waters as Outstanding or Exceptional Resource Waters. Surface waters which provide valuable fisheries, hydrologically or geologically unique features, outstanding recreational opportunities, unique environmental settings, and which are not significantly impacted by human activities may be classified as exceptional resource waters. The following waterbodies in Shawano County are currently designated:

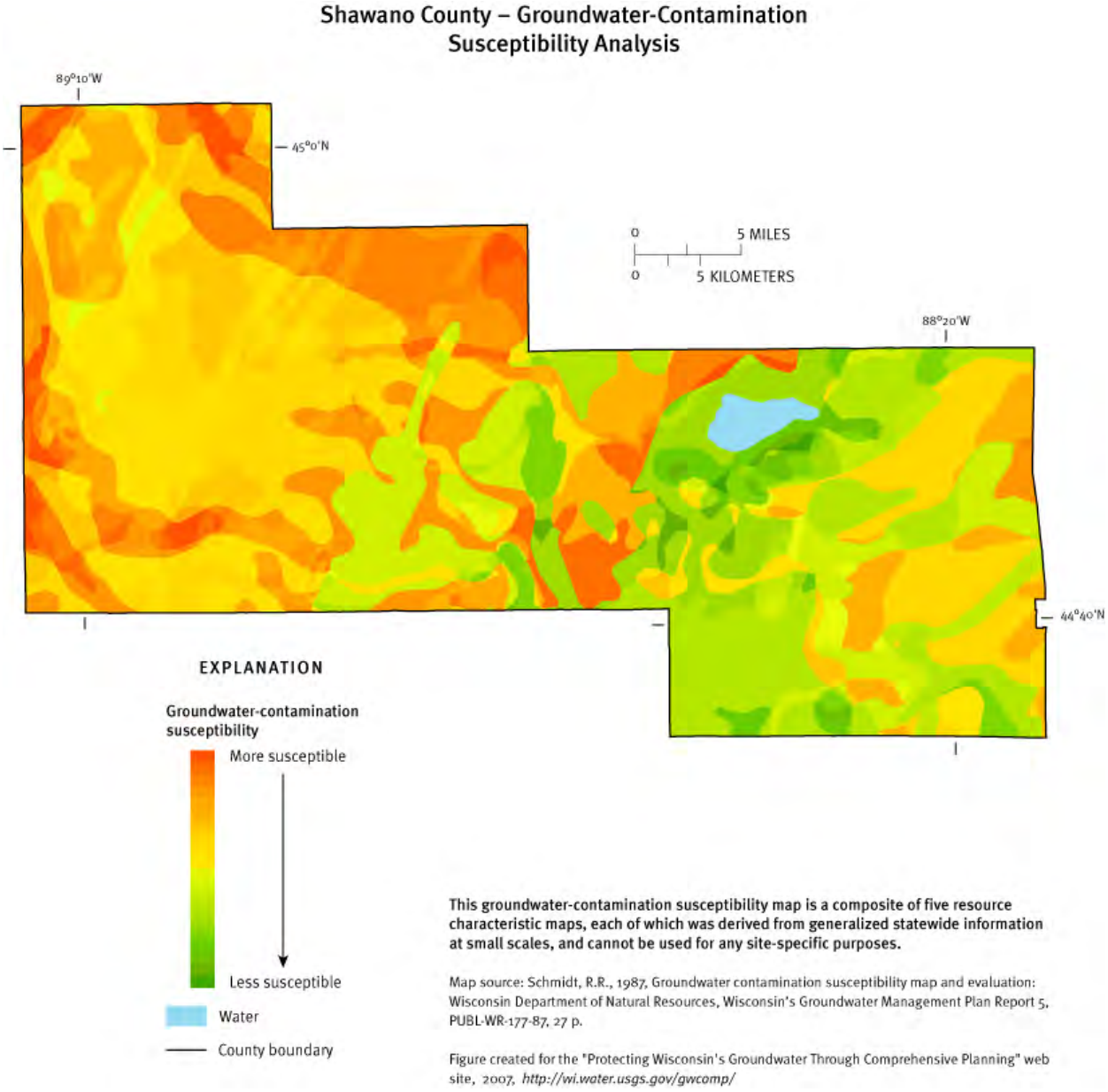
Outstanding Resource Waters – in Chapter NR102
Shawano Middle Br. Embarrass R. - Origin to but not including Homme Pond
No. Br. Embarrass R. - Origin to CTH J
So. Br. Embarrass R. - Origin to but not including Tigerton Pond

Exceptional Resource Waters – in Chapter NR102
Kroenke Creek Class II Portion
Red River from Lower Red Lake Dam to Wolf River
West Br. Red River Class II Portion
Embarrass River from Wolf River upstream to dam at Pella

Groundwater Resources

Groundwater is comprised of the portion of rainfall and snowmelt that does not run off to streams or rivers and that does not evaporate or transpire from plants. This water percolates down through the soil until it reaches the saturated zone of an aquifer. Groundwater supplies all of the water for domestic, commercial and industrial uses in Shawano County. The majority of the County's residents living outside of urbanized areas rely on private wells for their water supply. In general, groundwater use has

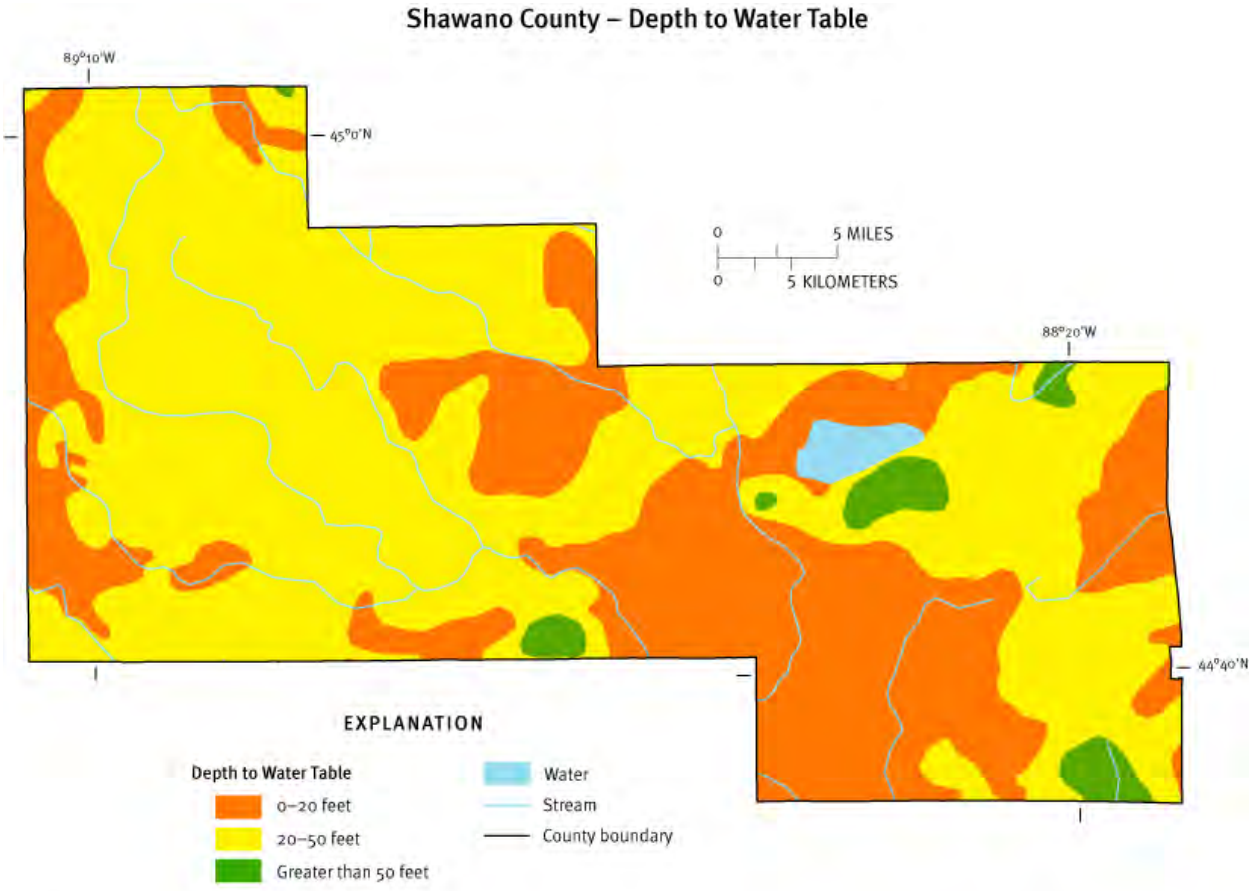
increased in the County and throughout the region. The ground water resources of Shawano County are generally of good quality and supply. However both the southeast portion and northwest portion of the county are areas where groundwater recharge is generally lower. There are also a percentage of well water tests each year which show nitrate, unsafe bacteria and corrosion problems.



In rural areas, the most common groundwater contaminant is nitrate-nitrogen, which can come from improperly functioning on-site wastewater systems, animal feedlots, livestock waste facilities, livestock waste and septage applications, lawn and agricultural fertilizers, and decaying plant debris. A 2002 report by the Central Wisconsin Groundwater Center found that 8.9 percent of private wells tested in Shawano County have levels of nitrate-nitrogen over the acceptable health standard (10 mg/liter). This same report indicated that 15.3 percent of private wells sampled in Shawano County tested positive for fecal coliform bacteria, which indicates that fecal wastes may be contaminating the water and that

pathogenic organisms could be present. Arsenic has been reported as an issue in groundwater in the eastern part of the County, and testing of well-water samples is critical to preventing harmful impacts.

Ground water is at various depths below the surface depending upon the general topography, elevation above permanent stream level, and the character of strata called aquifers. At certain depths below the surface all pores and fissures in the bedrock or in unconsolidated material such as sand and gravel are filled with water. It is into these water filled layers that wells must be drilled or points driven in order to obtain an adequate supply of water. The level of ground water will rise and fall from season to season and year to year depending on rainfall.



This resource characteristic map was derived from generalized statewide information at small scales, and cannot be used for any site-specific purposes.

Map source: Schmidt, R.R., 1987, Groundwater contamination susceptibility map and evaluation: Wisconsin Department of Natural Resources, Wisconsin's Groundwater Management Plan Report 5, PUBL-WR-177-87, 27 p.

Figure created for the "Protecting Wisconsin's Groundwater Through Comprehensive Planning" web site, 2007, *http://wi.water.usgs.gov/gwcomp/*

Glacial drift aquifers are the major source of ground water in the western ¾ of the county. The glacial drift over much of this area is 50 to 200 feet thick and produces well yields of 100 to 1,000 gallons per minute. There are some areas that have rock outcroppings or bedrock close to the surface, which hampers getting an adequate supply of potable water.

The bedrock aquifer is the major source of ground water in the eastern ¼ of the county. The Cambrian sandstones, the Prairie du Chien Group, and the St. Peter sandstone form the principal bedrock aquifer in this area. In general, these rock units are hydraulically connected and act as an aquifer to produce well yields of 100 to 500 gallons per minute. There are some karst features in the area which need to be protected such as adequate set back distances and buffering of sink holes.

Wetland Resources

In the early 1980's when the Shawano County Soil Survey was completed, approximately 86,000 acres of wetland existed in the county. This is probably around three quarters of the total wetland acreage that existed in the county prior to the late 1800's. Agricultural drainage and filling for transportation and urban development are the primary reasons for the conversions. This has helped to cause degraded water quality, loss of natural filtration and groundwater recharge and storage areas, loss of biodiversity, increased localized flooding, and loss of important fish and wildlife habitat.

Wetland habitats currently encompass approximately 22 percent of the County's total land area. These ecosystems play significant roles in maintaining the quality of groundwater and surface water and provide valuable habitats for fish, birds and other wildlife. These habitats are well distributed throughout the County. All wetlands of 5 or more acres in the County have been identified and mapped by DNR through its Wisconsin Wetlands Inventory and is a layer on the County GIS (see Map in Appendix C). A large tract of wetland habitat is located in the Navarino State Wildlife Area approximately 6 miles south of the City of Shawano. In addition to providing biodiversity and habitat for fish, waterfowl, and other wildlife species, wetlands are important for the recharge of aquifers and the protection of groundwater quality. They are extremely efficient at trapping and filtering out nutrients and sediments contained in runoff and they provide highly effective flood storage areas which protects surface water resources.

It is important that the remaining wetland resources in Shawano County be protected from further destruction. Currently, there are 282.4 acres of wetland in Shawano County enrolled in the Wetland Reserve Program (WRP). This is a voluntary program that provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private lands. The program provides an opportunity for landowners to receive financial incentives to enhance wetlands in exchange for retiring marginal land from farming. Existing county, state, and federal regulatory protection mechanisms need to be integrated and enforced. In addition, for the protection of wetlands adjacent to lakes and rivers, technical and financial resources for stream bank and shoreline erosion control measures need to be expanded.

Wildlife Resources

Shawano County has an abundant and diverse population of wildlife. Forest wildlife includes white-tailed deer, eastern wild turkey, ruffed grouse, woodcock, black bear, squirrels, snowshoe hare, fisher and many other non-game animals particularly in the western three-fourths of the county. The eastern part is extensively farmed and supports fox, coyote, cottontail rabbits, white-tailed deer and other more edge dependent species. In the southeastern part lies the state owned Navarino Wildlife Area managed by the DNR. This almost 15,000 acre wetland complex with sandy uplands provides habitat for a variety of other species. Sandhill cranes, Canada geese, mallards, wood ducks, muskrat, reptiles and amphibians make their home there. The DNR has also purchased tracts of land along the Wolf River south of the City of Shawano and the Embarrass River as part of their Lower Wolf River Bottomlands

Natural Resources Area for fish and wildlife habitat. Shawano Lake is used during migration in the spring and fall for a number of species of waterfowl and shorebirds.

Wisconsin DNR's Natural Heritage Inventory program maintains data on the general location and status of threatened or endangered plant and animal species and natural communities and species and communities of special concern. According to this inventory, Shawano County has at least 82 animal species (aquatic and terrestrial), 13 plant species and 23 natural communities that have been documented into one of these categories. Animal species include, but are not limited to, the Bald Eagle, Henslow's Sparrow and the Blanding's Turtle. Plant species include, but are not limited to, the Glade Fern, American Shore-grass, and Wild Licorice. More specific information on location and type of species is available from the State's Bureau of Endangered Resources.

Woodland Resources

Prior to settlement, the vegetation of Shawano County was mostly forested. Much of the woodland, especially the pine, was cleared during the early logging days (1850's through 1880's). Most of the area was then converted to agricultural use. Shawano County is located within Wisconsin's northern forest zone, characterized by a mixture of coniferous and deciduous forest types. Currently, woodlands comprise approximately half of Shawano County's total land area (see Map in Appendix C). In 2004, 248,844 acres or nearly 43 percent of Shawano County's land base were classified as forest by the Wisconsin Department of Natural Resources. All but approximately 11,400 acres are privately owned. Typical tree species include Hemlock, Beech, Sugar Maple, Yellow Birch, Aspen, and White and Red Pine. The western portion of the County falls more specifically within the Forest Transition ecological landscape; dense hardwood forests and timber stands are more characteristic of the western portion of the County. The eastern 2/3 of the County is located primarily within the Northern Lake Michigan Coastal ecological landscape. Eastern Shawano County is dominated by areas of lowland hardwoods, lowland conifers, Aspen, and Birch.

The county's woodlands are very important to the local economy. Besides the many sawmills there are many secondary wood industries that are dependent on the forest resource. The woodlands are also very important in terms of providing habitat for a variety of wildlife species. More importantly, from an agricultural perspective, are the soil conservation benefits from wind and water erosion reduction. Continued woodland management will be necessary in order to maintain these benefits. Programs that promote tree planting (currently 500 to 800 acres per year) and sustained management of woodland resources help landowners accomplish this objective. These include the federal Conservation Reserve Program and the Wisconsin Managed Forest Law Program.

Mineral Resources

Glacial deposits consist of soil, subsoil, sediment, sand, gravel, and/or stone, and are characterized by a variety of depths and patterns throughout the County. The geologic and glacial history of the county is reflected in its mineral resources that provide a substantial volume of the total aggregate material used in construction activities throughout the county and surrounding region. High quality limestone is found in the eastern third of the County, which is part of Sinnipee Group and the Prairie du Chien Group, which are separated by a small band of the St. Peter Formation.

It is important from an economical and environmental standpoint that these mineral resources are regulated. The County adopted a Non-Metallic Mine Reclamation Ordinance in 2001 to assure that lands opened to mining are reclaimed to near pre-mine conditions, or to a more environmentally

responsible use. Any new mineral extraction sites are subject to the reclamation standards under this ordinance, except as exempted within the ordinance. The ordinance includes requirements for applications, reclamation plans, multi-agency review, public hearings, and enforcement.

The East Central Wisconsin Regional Planning Commission (ECWRPC) administers the Chapter NR-135 non-metallic mining reclamation program for Shawano County. ECWRPC maintains a list of active and inactive non-metallic mine sites. As of 2014, 52 sites were listed under NR-135 permits in Shawano County. There were 634 active acres in the program with 23 sites encompassing one acre or less exempted from NR-135. Most of these sites mined sand, gravel, or both.

Currently, there are no active metallic mining activities in Shawano County because metallic minerals are not present in high quantities. However, there are some limited deposits of copper and other base metals in the northwestern portion of Shawano County.

Land Use Trends

Agriculture and forestry remain the dominant land uses in Shawano County and are expected to maintain that role well into the 21st century while urban development in the form of residential, commercial, industrial, and highway expansion will probably put growing pressures on the county's natural resource base. The recent upgrade of State Highway 29 to a four-lane expressway across the center of the county from east to west has opened the door for both residential and industrial expansion. If left uncontrolled, these changes could result in an increased impairment of natural resources due to the impacts associated with habitat fragmentation, construction site erosion, increased volume of runoff, and polluted runoff.

Comprehensive land use planning to help control the type and direction of growth has been adopted by Shawano County, its civil towns, villages and cities. The following were identified as overall goals for the *Shawano County Comprehensive Plan*:

- Conserve large tracts of contiguous, productive agricultural land through County and local community cooperation.
- Preserve and enhance the County's natural features, including lakes, rivers, forests, woodlands, wetlands, wildlife habitats, open spaces, and groundwater resources.
- Preserve the County's cultural, historic, and archeological sites; scenic character; and cultural assets.
- Promote a sustainable land use pattern that promotes the rural character of the County; provides new economic or housing opportunities; and allows the continuation of agriculture, forestry, and open lands uses.
- Provide a safe and complete transportation system that functions efficiently and meets the needs of all residents.
- Ensure that utilities, community facilities, and services meet the expectations of County residents and function effectively and efficiently.
- Coordinate utilities and community facilities decision-making with land use, transportation, intergovernmental, and natural resource planning. Encourage a wide range of housing choices to accommodate the variety of needs and desires of County residents.
- Apply conservation neighborhood design principles to new neighborhoods throughout the County.

- Strengthen the County's economy to maximize sustainable use of the County's assets and provide a robust source of employment and tax revenues.
- Cooperate with other jurisdictions – including communities within the County, neighboring units of government, and overlapping jurisdictions – on issues related to all elements of this *Comprehensive Plan*.

The Shawano County Comprehensive Plan states in the Wisconsin Land Legacy Report, the DNR identified those key places around the State that are critical to meeting Wisconsin's conservation and outdoor recreation needs over the next 50 years. Land Legacy Places that have been identified in Shawano County are as follows:

Comet Creek and Woodlands. This area is located in the southwestern corner of Shawano County. Comet Creek is a high quality trout stream that is a tributary to the Little Wolf River. The surrounding woodlands provide important habitat for many species of animals. Rock outcrops and various streams make this area a significant recreational resource in the County.

North Branch of the Embarrass River. This spring-fed trout stream is located in the west-central portion of Shawano County. The river flows through a mix of coniferous and deciduous swamps, pasturelands, and shrub wetlands. The surrounding land uses are predominately dairy farming and forestry.

The Oconto River. This river corridor, which passes through the northeastern corner of Shawano County, connects several areas of significant natural resources. It flows through large blocks of high quality forest and wetlands, and provides an excellent habitat for various species of fish. It is also a popular river for canoeists and kayakers.

Red River. Located in the central portion of Shawano County, the Red River supports various fish species and is a popular whitewater canoeing destination.

Sediment Delivery

Sediment adversely impacts water resources in a number of ways. Suspended sediment decreases water clarity making it difficult for many aquatic species to find food. High sediment concentrations abrade fish gills making the fish more susceptible to disease. The sediment also affects light penetration reducing the ability of rooted aquatic plants to survive. Sediment serves as the transport mechanism for a large portion of the total phosphorus loading. Finally, sediment covers and eliminates the bottom habitat critical for aquatic insects and fish spawning. The major rural sources of sediment are cropland erosion and degraded stream bank and shoreline erosion.

Sediments and nutrients contained in runoff from the rural/agricultural landscapes are the most significant forms of nonpoint source pollution impacting the water resources of Shawano County. These pollutants degrade water quality and impair recreational and biological uses. The principal rural nonpoint sources of pollution in Shawano County include:

- Sediment delivery from cropland and construction sites.
- Sediment eroded from degraded shorelines, stream banks and drainage ditches.
- Runoff from barnyards, livestock feeding areas, and pasturing areas.
- Runoff from land that was spread with manure.

T, Soil Loss and Sediment Delivery

The relationship between these three factors is sometimes misunderstood, and both "T" Value and soil loss have been greatly misused over the years. "**T" Value** "T", or Tolerable Soil Loss, is an estimate of the amount of soil that can be lost from a cropped field on a continual basis and still retain an adequate level of soil productivity. This value is strictly based on soil type. **Soil Loss** is the estimated amount of soil that is moving from one place to another on the landscape. It is calculated using the most current accepted soil loss equation and it provides a value that can be compared to "T". **Sediment Delivery** is the estimated amount of soil that is actually being delivered to surface water, therefore, it is the most relevant in terms of water quality.

"T" has been used as the standard for a number of state and federal programs, but in order to achieve the water quality goals in this plan it is necessary to think in terms of less than "T". Cropped fields are already at or below "T" in Shawano County, but these fields still account for more than half of the overall soil loss. Soil loss may provide an indication about how much soil is moving around on the landscape, but it does not tell how much sediment is actually being delivered to surface water. It should not be used as a water quality measurement. Sediment delivery is the measurement that must be the focus because it is the only one to estimate actual loading to surface water.

The Shawano County Land Conservation Department conducts an annual countywide Tillage Transect Survey of cropland to gather information on tillage practices, crop residue, crop rotations and soil loss rates. This survey began in 1999 and provides information that can be used to monitor trends and direct program activities like targeting specific data points where soil loss values are not meeting tolerable levels. Soil loss tolerance for a specific soil, also known as the T value, is the maximum average annual soil loss expressed as tons per acre per year that will permit current production levels to be maintained economically and indefinitely. T values range from 2 to 5 tons per acre per year. As of 2012, data from this survey estimates that 94.4% of cropland in Shawano County have soil loss rates at or below tolerable levels. Trends in soil loss for each HUC 10 watershed are shown in the Watershed Summaries section. Soil loss is important but does not account for sediment actually leaving the crop field. Soil erosion is not a significant concern but the average soil loss countywide has increased from 0.9 T/ac/yr in 2004 to 1.5 T/ac/yr in 2012. This is likely attributed to loss of smaller dairy farms, increases in row crops and less alfalfa in crop rotations. Even with this low average soil loss it is still important to prevent the movement of nutrient rich soil to surface waters by installing best management practices that reduce soil erosion rates. The intent is to develop a model that will utilize county specific GIS layers to estimate sediment and phosphorus pollutant loading.

Phosphorus Loading

Nutrient loading can adversely affect water quality by promoting excessive plant growth (macrophytes and algae) primarily in rivers and lakes. Phosphorus is the most significant nutrient that promotes macrophyte and algae growth. Excessive macrophyte growth causes severe oxygen fluctuations in the streams. Plants produce oxygen as they photosynthesize in the daylight, but at night this oxygen is used for plant respiration. Large swings in the daily level of dissolved oxygen can stress fish and other aquatic life. Also, excessive plant growth in the streams can restrict water flow and increase sedimentation rates.

High nutrient loading can also cause algae blooms to occur in the county's lakes and downstream impoundments in neighboring counties. The densities of these blooms vary according to the amount of

nutrient loading, temperature, and wave action. The blooms affect aesthetics, interfere with boating, swimming, and other recreational use of the waters, and further impact water quality and aquatic life. The blooms reduce sun light penetration which prevents more desirable rooted aquatic plants from growing. Aquatic insects, fish, waterfowl, and wildlife all depend on these rooted aquatic plants for survival. In addition, when the algae and other undesirable macrophytes die they consume oxygen during decomposition that can contribute to fish kills.

Phosphorus Loading from Cropland Sediment

Phosphorus can reach surface water by running off the land with water as soluble P, or as particulate P attached to soil particles that are washed into the water. For this plan, an estimate of the amount of phosphorus attached to the sediment that washes into surface water was used. It was somewhat difficult to find information specific to northeast Wisconsin regarding the relationship between cropland sediment and phosphorus loading. For this plan 1.5 pounds of phosphorus per ton of sediment will be used. This has been agreed to by the counties in the Wolf River Basin.

In 2013 Shawano County partnered with The Nature Conservancy through a Great Lakes Restoration Initiative (GLRI) grant to digitize field level soil test phosphorus from current nutrient management plans in the Pensaukee watershed. Approximately 13,000 acres were mapped. The LCD plans to utilize this information when planning and working with landowners in this watershed. Additional analysis of a fields potential to phosphorus runoff will be needed. This data will also allow LCD staff to target information and education efforts.

Soil Erosion and Sediment Delivery from Rural and Urban Development

Soil erosion and sediment delivery in urban areas of the County originate primarily at construction sites where large areas of exposed soil remain for extended periods of time and are subject to washing from snow melt and rainfall events. University research has shown that soil loss from construction sites range from 10 to 50 tons or more of silt and sediment per acre. Since the current focus of this Land & Water Resource Conservation Plan is on rural source pollutant load reduction, no definitive pollutant load reductions are specified for urban sources. Urban sources of pollution will be addressed through increased information and education efforts, combined with revisions and enforcement of county and city zoning ordinances and cooperation with DNR's One Acre Rule for erosion control plans. Under subchapter III of NR 216, Wis. Adm. Code, a notice of intent shall be filed with the DNR by any landowner who disturbs one or more acres of land. This disturbance can create a point source discharge of stormwater from the construction site to waters of the state and is therefore regulated by DNR. Agriculture is exempt from this requirement for activities such as planting, growing, cultivating and harvesting of crops for human or livestock consumption and pasturing or yarding of livestock as well as sod farms and tree nurseries. Agriculture is not exempt from the requirement to submit a notice of intent for one or more acres of land disturbance for the construction of structures such as barns, manure storage facilities or barnyard runoff control systems. (See s. NR 216.42(2), Wis. Adm. Code.) Furthermore, construction of an agricultural building or facility must follow an erosion and sediment control plan consistent with s. NR 216.46, Wis. Adm. Code and including meeting the performance standards of s. NR 151.11, Wis. Adm. Code.

Agricultural Trends

Shawano County agriculture industry has traditionally been dominated by dairy farms. In recent years this trend has continued, but with a larger portion of farmers cash cropping and or cattle. These changes mimic state trends which has heavily been influenced by grain commodity prices.
The trend of increasing farm size is also evident. Overall number of dairy farms have declined by nearly 41%, however the size of the remaining herds is expected to increase substantially. There are currently 7 Confined Animal Feeding Operations (CAFO's - > 1,000 Animal Units) permitted by the DNR in Shawano County.

Table 1: Selected USDA Agricultural Census Data for Shawano County – 1997 and 2012

Demographic	1997	2012	% Change
Number of farms	1,337	1,278	-4
Total acres in farms	270,487	261,141	-3
Average acres per farm	202	204	1
Acres of hay and haylage	87,935	59,377	-32
Acres of corn grain	41,898	55,460	32
Acres of corn silage	26,020	28,420	9
Acres of soybeans	6,528	21,400	227
Total head of cows	40,097	39,105	-2
Number of farms with cows	856	509	-41

It should also be noted that there is a growing trend of permanent grassland cover and wooded acreage being converted to active farmland. This is a negative trend from the standpoint of providing increased erosion control, water quality improvements, and wildlife habitat and it is expected to continue. Various USDA, state, and county programs have assisted landowners in planning for and implementing conservation practices on their lands. It is important that these programs and activities continue.

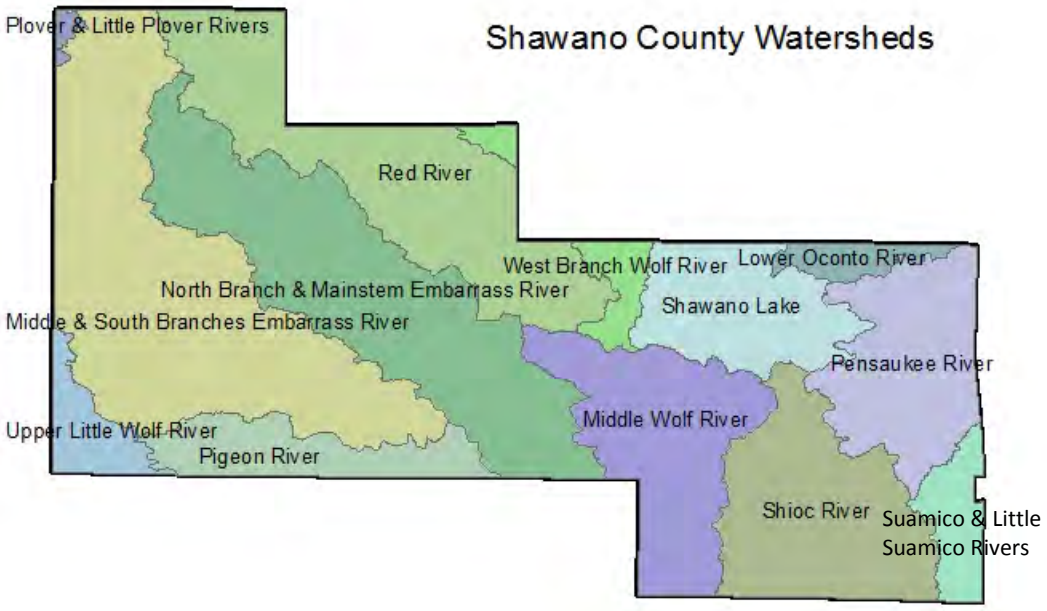
Agricultural Resources recommendations from the *Shawano County Comprehensive Plan* are:

- Prepare and maintain a future land use map and policies that limit non-agricultural development in agricultural areas.
- Use a Land Evaluation and Site Assessment system as a decision making tool to evaluate proposed changes to agricultural land.
- Explore a Purchase of Development Rights program.
- Update the County Farmland Preservation Plan.
- Promote strategies to increase farm family income without having to develop land.
- Capitalize on State initiatives and trends in farming, such as the Working Lands Initiative and the continued movement towards a bio-based economy.

Land & Water Resource Conditions

To establish priorities and a course of action in addressing nonpoint source pollution and its impact on land and water resources, it is necessary to assess the resources, based on type, extent, and location throughout the County. Although these assessments are based on water resource conditions in Shawano County, it must also be noted that there are strong communications and working relationships with the neighboring counties to foster common goals and objectives for resource improvement throughout the entire Basin.

The following Watershed Summaries provide general, descriptive characteristics and assessments of the type and extent of nonpoint source pollution that impact the watershed. The watershed analysis is separated into those portions of the Wolf River and Upper Green Bay Basins located within Shawano County. Approximately 89% of the county is located in the Wolf River Basin, and about 11% is in the Upper Green Bay Basin. The DNR Nonpoint Source Rankings (NPS) are included for each watershed which reflect an analysis of the waterbodies potential to respond to Best Management Practices. Watersheds listed as High are a priority to focus work activities. There are no specific pollution load reduction targets for these watersheds at this time. With recent developments on proposed waterbodies to the 2016 303(d) list of impaired waters along with TMDL planning for the Upper Fox and Wolf River Basin there are pollution load reduction targets on the horizon for these areas.



WOLF RIVER BASIN

Upper Little Wolf River Watershed

General Watershed Characteristics

This watershed is located in Marathon, Portage, Waupaca and Shawano Counties. A relatively small portion (19 square miles) lies in the southwest corner of Shawano County. It had a "medium" priority in watershed selection due to local significant animal waste problems and a soil erosion rate of 2.2 tons per acre per year. As indicated from the Land Use table, there is very little cropland in this area of the County. The 2008 annual transect survey shows 100% of the cropland < T. The data search for the Wolf River Basin indicated that habitat deterioration occurs from stream bank pasturing, which has been abated, and cropland runoff.

Table 3-1. Land Use in the Upper Little Wolf River Watershed

Land Use	Percent
Cropland	7%
Non-metallic Mining	Negligible
Grassland/Pasture	5%
Urban/Developed	5%
Wetlands	15%
Woodland	68%
Watershed Totals	100%

Land & Water Resource Assessment

Comet Creek, classified as a Class I trout stream, is being degraded by polluted runoff at certain locations. In-stream habitat evaluations were conducted at five locations on Comet Creek. Results indicated fair to good in-stream habitat. Most of the habitat problems were caused by stream-bank pasturing, particularly above Comet Road (Nieber, 1994). The NPS watershed rankings are: Streams – Medium, Lakes – NR, Groundwater – High and Overall – High.

North Branch and Main stem Embarrass River Watershed

General Watershed Characteristics

This long narrow watershed is located in the western half of the county. The primary land use is agriculture mixed with woodland. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	92.1 %	5.6 %	2.3 %	-
2008	97 %	3 %	-	-
2012	96 %	3 %	1 %	-

Table 3-2. Land Use in the North Branch and Main Stem Embarrass Watershed

Land Use	Percent
Cropland	35%
Non-metallic Mining	Negligible
Grassland/Pasture	3%
Urban/Developed	2%
Wetlands	20%
Woodland	40%
Watershed Totals	100%

Land and Water Resource Assessment

The North Branch and Main Stem Embarrass River Watershed lies in Outagamie, Waupaca and Shawano Counties with the northern 157 square miles of its total 292 square miles of drainage area lying in Shawano County. There are two municipal point source dischargers in the watershed within Shawano County: Village of Bowler and Embarrass/Cloverleaf Lakes Sanitary District No. 1.

The NPS watershed rankings are "high" priority for streams and lakes, "high" for groundwater and "high" overall because of critical animal waste and soil erosion problems. The data search for the Wolf River Basin plan indicates severe polluted runoff problems exist, with heavy soil losses, impaired fisheries, excess vegetation and dissolved oxygen violations.

Beaver Creek

Beaver Creek is a Class I trout stream, Hilsenhoff Biotic Index rates the water quality as good. This stream had been affected by stream bank erosion from cattle pasturing near or in the water.

Main Stem Embarrass River

The main stem extends from Caroline south through Waupaca and Outagamie Counties to New London where it enters the Wolf River. The river has a diverse fishery and is best known for its small mouth bass. The river also offers canoeing. It is an important sturgeon spawning stream up to the Pella Dam.

North Branch Embarrass River

The North Branch Embarrass River is a trout stream from its headwaters to the Pella Pond, where it supports an excellent warm water sport fishery. A State Fishery Area is located on this stream. The stream's problems include beaver activity and stream bank erosion from cattle pasturing. There are two impoundments on the river in Shawano County, which slow and warm the water. Approximately 1,824 feet of prefabricated bank cover devices were installed on the stream to provide overhead cover and improve habitat for the trout fishery in the late 1980's.

Mill Creek

All 24 miles of Mill Creek are trout water. This stream, once threatened by stream bank erosion from cattle pasturing, is now stable.

Pony Creek
Pony Creek is a nine mile tributary to the Tilleda Pond. A private trout hatchery is located along this stream and is potentially increasing in-stream nutrients with its discharge. This stream is threatened by stream bank erosion.

Pigeon River Watershed

General Watershed Characteristics
The Pigeon River Watershed lies in south central Shawano and north central Waupaca Counties and covers 115 square miles. 39 square miles lie in Shawano County. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	86.2 %	10.3 %	3.5 %	-
2008	85 %	9 %	3 %	3 %
2012	88 %	9 %	3 %	-

The NPS watershed ranking was "medium" priority for streams, "low" for groundwater, and "high" for lakes and "high" overall. The data search for the Wolf River Basin Plan indicated problems with excess vegetation, turbidity, and habitat degradation (Gansberg, 1993).

Table 3-3. Land Use in the Pigeon River Watershed

Land Use	Percent
Cropland	40%
Non-metallic Mining	Negligible
Grassland/Pasture	5%
Urban/Developed	2%
Wetlands	10%
Woodland	43%
Watershed Totals	100%

Land & Water Resource Assessment

North Branch Pigeon River
The North Branch Pigeon River is a slightly stained, Class I trout stream. The river is designated as an Exceptional Resource Water. It is impounded near Marion, forming the Marion Millpond. This shallow 110 acre pond also has a history of nutrient enrichment and aquatic plant problems (Gansberg, 1993). The pond was drained during the '07 – '08 winter and has responded favorably to the treatment.

South Branch Pigeon River
The South Branch Pigeon River originates in south central Shawano County. The upper reaches are designated as Exceptional Resource Waters. The river is impounded in Waupaca County, forming 20 acre Keller Lake. The watershed is principally wetland and forested above Keller Dam, and is agricultural

below. The stream suffers habitat deterioration from stream bank pasturing and cropland runoff, although the severity varies from year to year as crops are rotated.

Middle and South Branches Embarrass River Watershed

General Watershed Characteristics

The Middle and South Branches of the Embarrass River Watershed are in Shawano, Marathon and Langlade counties and cover 251 square miles. 195 square miles lie in the western end of Shawano County. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	96 %	4 %	-	-
2008	93 %	5 %	1 %	-
2012	94.5 %	2.2 %	3.3 %	-

Municipal point dischargers in the system are the Village of Birnamwood, Caroline Sanitary District No. 1, Village of Tigerton, and Village of Wittenberg.

The soils, geology and other physical resources indicate there are areas highly susceptible to groundwater contamination due to poor land use practices. A data search revealed groundwater samples with contamination, mainly from pesticides.

The NPS watershed ranking was “low” priority for streams, “medium” for groundwater, and “not-rated” for lakes and “low” overall because of locally significant soil erosion and animal waste problems. Most of the buffer areas along the streams are natural and undisturbed.

Table 3-4. Land Use in the Middle and South Branch Embarrass Watershed

Land Use	Percent
Cropland	20%
Non-metallic Mining	Negligible
Grassland/Pasture	3%
Urban/Developed	2%
Wetlands	20%
Woodland	55%
Watershed Totals	100%

Land & Water Resource Assessment

South Branch Embarrass River

The South Branch Embarrass River is Class I and II trout water and extends for 37 miles and meets the mainstem at Caroline as does the Middle Branch. This stream has good water quality but sustains some moderate problems from vegetation. Some habitat deterioration has occurred due to agricultural and manure runoff.

Middle Branch Embarrass River
The Middle Branch Embarrass River originates in Langlade County, and flows south and eastward through Shawano County. It is a Class I and II trout stream. The river has excellent water quality as indicated by its Hilsenhoff Biotic Index scores. The river provides excellent fisheries habitat. There are some cattle pasturing along the stream banks.

Tiger Creek
Tiger Creek is a 13 mile tributary to the South Branch Embarrass. It is Class I trout water. The relocation of the Wittenberg wastewater treatment discharge to the Middle Branch and the end of the wet operation of the AMPI Morning Glory Dairy Farms Division in the mid 1990's has greatly improved water quality.

Shioc River Watershed

General Watershed Characteristics
The Shioc River is a tributary to the Wolf River, having its headwaters in Shawano County at Bonduel and flowing south and west to meet the Wolf River in Outagamie County north of the City of Shiocton. It is a Class I trout stream to Porter Road and Class II downstream to Sunrise Road. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	96 %	4 %	-	-
2008	100 %	-	-	-
2012	96.5 %	1.2 %	2.3 %	-

In the County, there no longer are any municipal point source dischargers as the Village of Bonduel has diverted its sanitary sewage to the Shawano waste treatment plant and the pickling plant has been converted to a furniture factory. NPS watershed ranking was "high" priority for streams, "high" for groundwater, and "not-rated" for lakes and "high" overall

Table 3-5. Land Use in the Shioc River Watershed

Land Use	Percent
Cropland	75%
Non-metallic Mining	1%
Grassland/Pasture	5%
Urban/Developed	2%
Wetlands	15%
Woodland	2%
Watershed Totals	100%

Land & Water Resource Assessment

Black Creek
Black Creek is the largest tributary to the mainstem Shioc River. It is a main channel for agricultural surface and subsurface drainage in the county.

Mink Creek
Mink Creek is a seven mile tributary and is valuable as a spawning area. The stream flows through mainly agricultural land and is used for cropland drainage. At low flows it becomes intermittent with standing pools.

Shioc River
The main stem is formed by the confluence of the West and East Branch of the Shioc River north of Navarino and extends for 28 miles. The Shioc and its tributaries flow through agricultural land with little or no vegetative buffering.

Middle Wolf River Watershed

General Watershed Characteristics
The 128 square mile Middle Wolf River Watershed is in Shawano, Waupaca and Outagamie Counties. The watershed extends from the confluence of the Red River, north of Shawano, to where the Shioc River meets the Wolf River north of Shiocton. 86 square miles lies in Shawano County. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	95.6 %	2.9 %	1.5 %	-
2008	96 %	4 %	-	-
2012	97.3 %	2.7 %	-	-

There is one industrial point source discharger and two municipal point source dischargers in the watershed: Maple Lane Health Care Facility, Shawano Lake Sanitary District, and Shawano Paper Little Rapids Corporation.

The Middle Wolf River Watershed NPS ranking is a “high” priority for streams, “low” for lakes and “high” for groundwater and “high” overall. The data search found that streams including the main stem Wolf River are suffering from stream bank erosion and animal waste problems. The northern 20% of the watershed is highly susceptible to groundwater contamination by poor land use practices due to the soils and geology of the area.

Table 3-6. Land Use in the Middle Wolf River Watershed

Land Use	Percent
Cropland	45%
Non-metallic Mining	Negligible
Grassland/Pasture	3%
Urban/Developed	2%

Wetlands	40%
Woodland	10%
Watershed Totals	100%

Land & Water Resource Assessment

Wolf River
There are 47 miles of the Wolf River in this watershed and no major tributaries. The portion of the river below the City of Shawano is an excellent fishery for walleye, small mouth bass, northern pike and channel catfish. It is also very important for sturgeon spawning in the spring. Young sturgeon use the river as a nursery area for up to four years before they move downstream into the Winnebago System's deeper waters. The lake sturgeon is listed as a rare species in the United States. The Lake Winnebago waterway system has the largest single concentration of sturgeon in the world. Poor water quality presents serious problems. The sturgeon spawning and nursery areas on the Wolf River from Shawano to New London must be protected.

Pollution sources along the Wolf River include animal wastes and cropland runoff. A mercury consumption advisory exists for walleye greater than 15 inches below the Shawano dam to Highway 156.

Rose Brook
Rose Brook is a seven mile, hard water Class I trout fishery for its first two miles. The remaining five are classified as warm water sport fishery. The land in its drainage area is primarily agriculture, with some forest areas. Some stream bank pasturing occurs.

Long Lake and Schoenick Creek
Schoenick Creek is a seven mile, hard water (high ph), warm water forage fishery discharging to the Wolf River. It begins at Long Lake and flows through Schoenick Lake before draining to the Wolf River. Andrew Hudak, WDNR Water Resources Management Specialist, has been working with members from the Long Lake Association in 2014/15 with monitoring efforts on the lake and within the watershed. Currently, Schoenick Creek and one of the unnamed tributaries has been placed on the proposed 2016 303(d) list of impaired waters. These waters all exceed the Total P criteria for streams of 0.075 mg/l and also have impaired biology.

School Section Creek
School Section Creek is a six mile, hard water, warm water forage fishery discharging to the Wolf River. Stream bank pasturing occurs in some areas, causing erosion and vegetative cover loss.

Shawano Lake Watershed

General Watershed Characteristics
The Shawano Lake Watershed lies within the Wolf River Basin in Shawano and Menominee Counties and covers 71.2 square miles (61 square miles lie in Shawano County). The watershed contains many lake, river and wetland resources but the main water resource is Shawano Lake. Other smaller lakes include Bahr Lake, Deer Spring Lake, Korth Lake, Lily Lake, Littman Lake, Loon Lake, Lulu Lake, Mud Lake, Spring Lake, Washington Lake and White Clay Lake. A number of the lakes have a management organization

associated with them. These organizations include Lake Districts (Lulu, Loon, White Clay, and Washington), a Lake Association (Shawano Area Waterways Management) and/or a Sanitary District (Shawano Lake). These organizations are a key component in management activities involving the lakes. Rivers in the watershed include Duchess Creek, Loon Creek, Murray Creek, Pickerel Creek, Shawano Lake Outlet and several others.

According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	89.7 %	10.3 %	-	-
2008	95 %	5 %	-	-
2012	92 %	2.7 %	5.4 %	-

Municipalities in the watershed include City of Shawano (partial) and Village of Cecil. The Village of Cecil is the only point source discharger in the watershed.

The southern and eastern portions of the watershed are primarily agricultural and runoff from these areas can have a negative impact on the water quality of the lakes. Aquatic invasive species have become a nuisance in recent years. They include Eurasian water milfoil, curly-leafed pondweed and zebra mussels.

The NPS watershed ranking was “not-rated” for streams, “high” for groundwater, and “high” for lakes and “high” overall.

Table 3-7. Land Use in the Shawano Lake Watershed

Land Use	Percent
Cropland	31%
Non-metallic Mining	Negligible
Grassland/Pasture	3%
Open Water	18%
Urban/Developed	4%
Wetlands	14%
Woodland	30%
Watershed Totals	100%

Land & Water Resource Assessment

Shawano Lake Outlet

The Shawano Lake Outlet empties into the Wolf River Pond just above Shawano. The channel provides critical spawning habitat and nursery areas for fish. The Outlet is a major boating thoroughfare, connecting Shawano Lake with the Wolf River. There are five groundwater remediation sites, which hold general permits to discharge from petroleum extraction systems. Shawano Parks and Recreation also holds a general permit to annually discharge water from the public swimming pool.

Duchess Creek
Duchess Creek is a medium hard water stream and a tributary to Shawano Lake. Northern pike, walleye and suckers make use of this stream on their spring spawning runs. Wood and wild lands as well as swamp wetlands are predominant in its drainage area. The wastewater treatment lagoons for the Village of Cecil also contribute flow to Duchess Creek prior to it entering Shawano Lake.

Loon Creek
Loon Creek is a medium hard water stream containing a warm water sport fishery. The creek is an outlet from Loon Lake and a tributary to Washington and Shawano Lakes. The section of stream located between these lakes is owned by the Bureau of Fisheries Management.

Murray Creek
Murray Creek originates in the City of Shawano and is a hard water stream and tributary to Shawano Lake. Minnows, northern pike, and suckers make use of this stream on their spring spawning runs. The watershed, which had been predominantly wooded and wild has been partially developed by the Shawano Industrial Park. This has caused problems with nonpoint pollution in the headwaters from street and parking lot runoff. Approximately 10% percent of the watershed area is agricultural.

Pickerel Creek
Pickerel Creek is a hard water stream and a tributary to Shawano Lake. Northern pike and walleye utilize this creek during spring spawning runs. Other fish found particularly at the mouth of the creek include walleye, bullhead, largemouth bass, bluegill, pumpkinseed and sucker. A portion of the stream flows through the Mud Lake Wildlife Area and is of value to nesting and migratory waterfowl. The lower portions of Pickerel Creek flow through the Village of Cecil, which contributes stormwater runoff.

Shawano Lake
Shawano Lake is a 6,063 acre drainage lake with a mean depth of 9 feet and maximum of 42 feet. It is an important year-around recreational water body offering an excellent opportunity for hunting, swimming, boating, and fishing. Its versatility for recreational use makes it vitally important for the local economies. In general, Shawano Lake has relatively good water quality for a shallow drainage lake. The lake tends to have enriched sediment and relatively shallow depths, which results in ideal growing conditions and light penetration needed for aquatic plant growth. Approximately 90% of the Shawano Lake shoreline is highly developed with residences. Municipal sanitary sewer and public water supply systems have been in place since the mid 1970's. It has helped to improve water quality but probably has aided the increase of residential development. Uncontrolled stormwater runoff and fertilizer use likely adds nutrients and potentially toxic substances to the lake. Water quality in Shawano Lake is dependent upon internal and external factors. The watershed, as a whole, contributes about half of the annual phosphorus load to the lake. These factors include direct runoff and loading from tributaries. The greatest single contributor of total phosphorus to Shawano Lake is internal sediment release; this is difficult and expensive to directly manage. Extensive scientific studies to evaluate the hydrology and water quality entering and within Shawano Lake have been conducted over the past 10 years as part of a cooperative effort between Shawano County, Shawano Area Waterways Management, Inc. (SAWM), the University of Wisconsin–Stevens Point (UWSP) Center for Watershed Science and Education (CWSE), the U.S. Army Corps of Engineers (USACOE), the Wisconsin Department of Natural Resources (WDNR), the Fox Wolf Watershed Alliance (FWWA), Northern Environmental (Bonestroo) and the dedicated volunteers and citizens of the Shawano Lake area.

Andrew Hudak, WDNR Water Resources Management Specialist, has been working with members from SAWM in 2014/15 with monitoring efforts on the lake and 6 tributaries within the watershed. Two of those tributaries on the south side of the lake have been placed on the proposed 2016 303(d) list of impaired waters. These waters all exceed the Total P criteria for streams of 0.075 mg/l and also have impaired biology.

Shawano Lake's ecosystem appears to be in flux due to the introduction of many non-native aquatic organisms including zebra mussels, Eurasian water milfoil, and curly leaf pondweed. Control of aquatic invasive species is a priority for SAWM, lake shore residents and lake users.

Loon Lake
Loon Lake is a 305-acre lake with a maximum depth of 22 feet and 2.7 miles of shoreline that drains to Washington Lake. There is one public boat landing on the south shore that will accommodate about 20 boat trailers. The lake has a diverse warm water fishery. Although approximately 50% of the lake is developed for single family residential or youth camp uses, the entire western shore of the lake was purchased by the Lake District under a DNR lake protection grant. The intention of the Lake District is to protect the wetland from development which would disturb the lake ecosystem and disturb the tranquil aesthetics for residents.

The Loon Lake-Wescott Management District actively manages the lake. A hybrid milfoil, a cross between the native Northern milfoil (Myriophyllum sibiricum) and the invasive Eurasian water milfoil, is present and has been treated chemically for the past several years. Their hybrid milfoil project is part of a big research project being conducted by the Army Corp of Engineers and the DNR's Research service. The Lake District has applied for DNR Aquatic Invasive Species grants to help pay for planning and management activities. The Lake District is also very active in the Clean Boats Clean Waters program and has signs on the landing informing lake users of the critical habitat areas.

Lulu Lake
Lulu Lake is a 34-acre lake, managed by the Lulu Lake Management District. Eurasian water milfoil is being actively managed with the help of DNR Aquatic Invasive Species grants. The DNR and citizen volunteers monitor Lulu Lake's aquatic plant community.

Washington Lake
Washington Lake is a 75-acre lake connected to Shawano Lake via a small channel. Maximum lake depth is 18 feet and 1.45 miles of shoreline. Washington Lake is a popular lake for recreation and fishing and has one public boat landing that can accommodate about 10 boat/trailer units. The northwestern areas of the lake are protected by a natural wetland. Adult zebra mussels were confirmed in July 2012. The Washington Lake Management District is currently extensively managing Eurasian water milfoil on an annual basis. The Lake District has received DNR Aquatic Invasive Species grants to help pay for planning and management activities. Citizen volunteers monitor Washington Lake.

White Clay Lake
White Clay Lake is a 234-acre spring lake with a maximum depth of 46 feet and 2.8 miles of shoreline. This is one of the Long Term Trend Lakes and is monitored several times each year by the DNR, in addition to the Citizen volunteers that also monitor it. Previous studies have concluded that the lake water quality is impacted by nonpoint sources of pollution.

Approximately 90% of the shoreline is wetland marsh. There is one public boat landing on the southeast shore that will accommodate 14 truck/boat trailers. A campground with a private boat landing is also located on the south shore. It is a very popular lake for fishing and is not uncommon to have over 20 truck/boat trailers parked here at any one time. The lake supports a two-story fishery with warm water species near the surface and a walleye fishery at deeper depths. There is speculation that natural walleye reproduction has been significantly reduced by the elimination of historic spawning grounds by narrow-leafed cattails. Several invasive species are found in White Clay Lake. EWM and CLP are significant lake management issues. Chinese mystery snails were discovered in 2012. With minimal development on the lake, it is likely this species will remain restricted to the boat landings.

The White Clay Sportsman Club has been active since the early 1970's and promotes recreational activities including an annual fishing derby and fish stocking on White Clay Lake. The White Clay Lake P & R District was established in 1975 and worked with EPA, DNR, SCS and local government staff on the White Clay "Clean Lakes" Protection and Rehabilitation Watershed project. It was the first lake protection project under the new lake management program and was also the first Lake District to attempt to address agriculturally related problems through upland treatment practices. The newly invigorated district is beginning to address invasive species issues in cooperation with the sportsmen club.

Red River Watershed

General Watershed Characteristics

The 208 square mile watershed is in south central Langlade, north central Shawano, and southwest Menominee counties. 123 square miles of the watershed area lie in Shawano County. The river also flows through the Menominee and Stockbridge Reservations. Nearly all streams in this watershed are classified as trout waters. There are dairy operations in the upper reaches in Langlade County. Polluted runoff could affect water quality. The NPS watershed ranking was "low" for streams, "medium" for groundwater, and "not-rated" for lakes and "low" overall. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	98 %	2 %	-	-
2008	97 %	3 %	-	-
2012	98.3 %	1.7 %	-	-

Table 3-8. Land Use in the Red River Watershed

Land Use	Percent
Cropland	35%
Non-metallic Mining	Negligible
Grassland/Pasture	3%
Wetlands	10%
Woodland	50%
Urban/Developed	2%
Watershed Totals	100%

Land & Water Resource Assessment

Red River

The main stem of the Red River originates in Langlade County and flows southeast for 43 miles where it empties into the Wolf River north of Shawano. The entire stream is classified as trout waters, however, there are some non-trout waters on the river. Small mouth bass are prominent especially on the lower reaches. The river is impounded above and below the Village of Gresham forming Upper and Lower Red Lakes. In 2005 the shore land owners of these lakes formed a lake district with the primary purpose of controlling the invasive aquatic species Eurasian water milfoil and curly-leafed pondweed. Rapids and falls in the river provide aesthetic qualities and recreational potential, especially for canoeists and kayakers.

Red Lakes

Lower Red Lake, also known as Weed Dam Pond, is a 240 acre impoundment connected to Upper Red Lake. It has a maximum depth of 28 feet and 6.3 miles of shoreline. Lower Red Lake is a popular lake for fishing and has two public boat landings. One on the north shore can accommodate about 15 boat/trailer units, and one on the west shore. The lake has an excellent warm water fishery.

Upper Red Lake, also known as the Gresham Pond, is a 188 acre impoundment of the Red River. It has a maximum depth of 15 feet and 4.8 miles of shoreline. Upper Red is a popular lake for fishing and has two public boat landings. One landing on the north shore can accommodate about 10 boat/trailer units, and the one on the south shore can accommodate a similar number.

Both lakes are experiencing issues with AIS. Eurasian water milfoil dominates both lakes in the summer. Curly-leaf pondweed is found in isolated areas on both lakes. The district now chemically treats and harvests the plants to keep them in check. Chinese mystery snails have become abundant in Upper Red Lake and are beginning to appear in Lower Red Lake.

West Branch Wolf River Watershed

General Watershed Characteristics

The West Branch Wolf River Watershed includes the portion of the river from the mouth of the Rid River north of the City of Shawano to near the mouth of the Evergreen River in Menominee County. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	100 %	-	-	-
2008	100 %	-	-	-
2012	100 %	-	-	-

The NPS watershed ranking was “not-rated” for streams, “low” for groundwater, and “not-rated” for lakes and “not-rated” overall.

Table 3-9. Land Use in the West Branch Wolf River Watershed

Land Use	Percent
Cropland	78%
Non-metallic Mining	Negligible
Grassland/Pasture	10%
Wetlands	5%
Woodland	5%
Urban/Developed	2%
Watershed Totals	100%

Land & Water Resource Assessment
The main stem Wolf River extends for 25 miles in this watershed, flowing through primarily wild areas, particularly within the Menominee Reservation. The river is classified as a warm water sport fishery along its entire reach.

UPPER GREEN BAY BASIN

Suamico and Little Suamico Rivers Watershed

General Watershed Characteristics
The Suamico and Little Suamico Rivers arise in eastern Shawano County and flow easterly to Green Bay, draining 139 square miles. Streams in this watershed are generally small and shallow and are not conducive to the development of a sport fishery. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	100 %	-	-	-
2008	96 %	4 %	-	-
2012	100 %	-	-	-

Primary land use in the watershed is agricultural, with dairy farming most prevalent. Sediment reduction and animal waste runoff control is a primary concern to reduce the nonpoint pollution impacts on Green Bay itself.

Table 3-10. Land Use in the Suamico and Little Suamico Rivers Watershed

Land Use	Percent
Cropland	98%
Non-metallic Mining	Negligible
Grassland/Pasture	1%
Wetlands	1%
Woodland	Negligible

Urban/Developed	Negligible
Watershed Totals	100%

Land & Water Resource Assessment
The NPS watershed ranking was "high" for streams, "high" for groundwater, and "not-rated" for lakes and "high" overall. The tributaries in Shawano County are primarily cropland drainage ditches. Buffers would be the most beneficial management practice for sediment reduction to the system. Continued barnyard runoff controls and nutrient management would also be very valuable for water quality.

Pensaukee River Watershed

General Watershed Characteristics
The Pensaukee River watershed covers 160 square miles in Shawano and Oconto counties. 70 square miles lie within Shawano County. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	98 %	2 %	-	-
2008	100 %	-	-	-
2012	96.6 %	3.4 %	-	-

The river arises in eastern Shawano County and flows east though Oconto County to Green Bay. Streams in the watershed are generally shallow, small, and are not conducive to the development of a sport fishery, although northern pike rely on the rivers and tributaries for spawning habitat. The Pensaukee's lowest seven day average low flow in 10 years at Krakow was zero, no flow.

Primary land use is agricultural with dairy farming being most prominent. Point source dischargers are the Krakow WWTP and Graf Creamery. Failing or inadequate septic systems had been a problem in the Zachow area. The last ten years has seen a tremendous improvement with the replacement of failing systems. This trend will continue with the enforcement of the County's POWTS ordinance.

Table 3-11. Land Use in the Pensaukee River Watershed

Land Use	Percent
Cropland	68%
Non-metallic Mining	Negligible
Grassland/Pasture	2%
Wetlands	3%
Woodland	24%
Urban/Developed	3%
Watershed Totals	100%

Pensaukee River

The NPS watershed ranking was "high" for streams, "high" for groundwater, and "not-rated" for lakes and "high" overall. Flows in the river are extremely variable. Flows near Pensaukee in Oconto County have ranged from 5.3 to 3,880 cubic feet per second. Agricultural drainage and loss of natural wetlands have probably had an influence on this dilemma. Farming operations have also added to the nutrient and sediment loading of the system.

The watershed was selected as a Priority Watershed Project through the Nonpoint Program. The Land and Water Conservation Board approved the plan in December 1996. Implementation began in 1997. The program was well received by the landowners and has been successful with the continued support from the state. The priority watershed program ended in December 2008. At this time 34 farms in the Shawano County portion are enrolled in the USDA Conservation Security Program which ensures that the practices established through the watershed program will be continued.

Lower Oconto River Watershed

General Watershed Characteristics

The Lower Oconto River watershed lies in central Oconto County with a small (only 13 square miles) extending into northeastern Shawano County. According to the county tillage transect survey, cropland soil erosion rates as a percentage are as follows:

Year	< or = T	1 – 2 T	2 – 3 T	>3 T
2004	100 %	-	-	-
2008	100 %	-	-	-
2012	64 %	27 %	9 %	-

The NPS watershed ranking was "low" for streams, "high" for groundwater, and "not-rated" for lakes and "low" overall.

Table 3-12. Land Use in the Lower Oconto Watershed

Land Use	Percent
Cropland	65%
Non-metallic Mining	Negligible
Grassland/Pasture	5%
Wetlands	20%
Woodland	9%
Urban/Developed	1%
Watershed Totals	100%

Chapter 3- Performance Standards and Prohibitions

Effective October 1, 2002, and revised effective January 1, 2011, Chapter NR 151 Wisconsin Administrative Code sets forth state minimum performance standards and prohibitions for farms and urban areas. These performance standards and prohibitions were designed to achieve water quality standards by limiting nonpoint source water pollution. It is the landowner's responsibility to meet the agriculture performance standards and prohibitions. The role of the Shawano County Land Conservation Department is to assist landowners in planning, designing, installing and approving management plans and practices to meet NR 151 standards. The Department of Natural Resources (DNR) has developed ten components to NR 151 implementation that identify DNR's role and their expectations of counties for each implementation component. The following list is a summary of the Agricultural Performance Standards and Prohibitions. There are further details contained in the code related to effective dates and cost share requirements for new or existing facilities.

Performance Standards

NR 151.02 Sheet, rill and wind erosion
All land where crops or feed are grown and pastures shall be cropped to achieve a soil erosion rate equal to, or less than, the "tolerable" (T) rate established for that soil.

NR 151.03 Tillage setback
The purpose of this standard is to prevent tillage operations from destroying stream banks and depositing soil directly in surface waters.

1. No crop producer may conduct a tillage operation that negatively impacts stream bank integrity or deposits soil directly in surface waters.
2. No tillage operations may be conducted within 5 feet of the top of the channel of surface waters. Tillage setbacks greater than 5 feet but no more than 20 feet may be required for this standard.
3. Crop producers shall maintain the area within the tillage setback in adequate sod or self-sustaining vegetative cover that provides a minimum of 70% coverage.

NR 151.04 Phosphorus index
1. All crop and livestock producers shall comply with this section.
2. Croplands, pastures, and winter grazing areas shall average a phosphorus index of 6 or less over the accounting period and may not exceed a phosphorus index of 12 in any individual year within the accounting period.

NR 151.05 Manure storage facilities
All livestock producers building new manure storage facilities, substantially altering manure storage facilities, or choosing to abandon their manure storage facilities shall comply with this section.

New or substantially altered manure storage facilities shall be designed, constructed and maintained to minimize the risk of structural failure of the facility, minimize leakage of the facility in order to comply with the groundwater standards. The levels of materials in the storage facility may not exceed the margin of safety level.

Closure of a manure storage facility shall occur when an operation where the facility is located ceases operations, or manure has not been added or removed from the facility for a period of 24 months. The

owner or operator many retain the facility for a longer period of time by demonstrating all of the following conditions are met:

1. The facility is designed, constructed and maintained in accordance with an accepted standard.
2. The facility is designed to store manure for a period of time longer than 24 months.
3. Retention of the facility is warranted based on anticipated future use. Manure storage facilities in existence as of October 1, 2002, that pose an imminent threat to public health or fish and aquatic life or are causing a violation of groundwater standards shall be upgraded, replaced or abandoned in accordance with this section.

NR 151.055 Process wastewater handling

1. All livestock producers shall comply with this section
2. There may be no significant discharge of process wastewater to waters of the State based on consideration of multiple factors related to the discharge.

NR 151.06 Clean water diversions

All livestock producers within a water quality management area shall comply with this section. A water quality management area, as defined by NR 151 is the area within 1,000 feet from the ordinary high water mark of navigable waters that consist of a lake, pond or flowage, except that for a navigable water that is a glacial pothole lake, the term means the area within 1,000 feet from the high water mark of the lake; the area within 300 feet from the ordinary high water mark of navigable waters that consist of a river or stream; and a site that is susceptible to groundwater contamination, or that has the potential to be a direct conduit for contamination to reach groundwater.

Runoff shall be diverted away from contacting feedlot, manure storage areas and barnyard areas within water quality management areas except that a diversion to protect private well is required only when the feedlot, manure storage area or barnyard area is located upslope from the private well.

NR 151.07 Nutrient management

All livestock and crop producers that apply manure or other nutrients directly or through contract to agricultural fields shall comply with this section.

Manure, commercial fertilizer and other nutrients shall be applied in conformance with a nutrient management plan. The nutrient management plan shall be designed to limit or reduce the discharge of nutrients to waters of the state for the purpose of complying with state water quality standards and groundwater standards.

Prohibitions

NR 151.08 Manure management prohibitions

All livestock producers shall comply with this section.

1. No overflow of manure storage facilities.
2. No unconfined manure pile within a Water Quality Management Area (WQMA).
4. No direct runoff from a feedlot or stored manure into the waters of the state.
5. No unlimited access by livestock to waters of the state in a location where high concentrations of animals prevent the maintenance of adequate sod or self−sustaining vegetative cover (does not apply to properly designed, installed and maintained livestock or farm equipment crossings).

NR 151 Local Implementation Strategy

The following is a description of the procedures that the Shawano County Land Conservation Department may use to assist landowners in meeting the Chapter NR 151 Agricultural Performance Standards and Prohibitions. This implementation strategy is based on Land Conservation Department staff and funding availability. A review and agreement of this strategy was provided by Erin E. Hanson, DNR Nonpoint Source Coordinator. Recommendations from Erin's review were incorporated into the strategy below.

Priority Farm and Priority Site Identification

With over 500 livestock operations and over 200,000 acres of cropland in Shawano County, it is essential that a prioritization process be implemented to address the requirements of Chapter NR 151. Due to limited staff, the Shawano County Land Conservation Department has developed the following priority farm identification strategy over the next ten years:

Priority Farm Identification

1st Priority – Farms where a valid complaint has been received regarding the violation of the agricultural performance standards or prohibitions.

2nd Priority – Farms participating in the Working Lands Initiative (Farmland Preservation Program) and farms applying for Farmland Preservation Agreements which require conservation compliance checks.

3rd Priority – Farms applying for a permit under the Shawano County Livestock Waste Management Ordinance.

4th Priority – Farms applying for cost-share assistance under the Land and Water Resource Management program, Targeted Runoff Management Program or through the NR 243 Program due to a Notice of Discharge.

5th Priority – Inventory farms located within 1,000 feet of surface water* for compliance with the agricultural performance standards and prohibitions.

6th Priority – Inventory farms located in watersheds draining to 303(d) waters for compliance with the agricultural performance standards and prohibitions.

7th Priority – Farms that voluntarily request assistance to install soil and water conservation practices.

**Surface water: Defined as all perennial or intermittent streams, rivers, lakes and wetlands as identified on the county GIS hydrography layer. Road ditches or waterways can also be classified as surface water if they act as a direct conduit to any perennial or intermittent stream, river, lake or wetland with little or no filtration.*

The following criteria are established to determine priority sites for stream bank and shoreline erosion, upland erosion, and nutrient loading from animal manure. These criteria will be applied to guide cost share eligibility. All sites are subject to program eligibility requirements and funding may be available.

Streambank/Lakeshore Erosion

Priority 1: Soil loss exceeding 2,000 pounds per year with adjacent wetland or aquatic vegetation or; soil loss exceeding 6,000 pounds per year with no adjacent wetland or aquatic vegetation.

Priority 2: Any site experiencing soil loss between 2,000 and 6,000 pounds per year with no adjacent wetland or aquatic vegetation.

Upland Erosion (Sheet, Rill, Gully)

Priority 1: Sites experiencing active gully erosion.

Priority 2: Any site delivering 1.0 pounds or greater of phosphorus/acre/year.

Priority 3: Any site delivering greater than 0.5 pound of phosphorus/acre/year.

Nutrient Loading from Livestock Waste

Priority 1: Any site that contributes 50 pounds or more of phosphorus per year.

Priority 2: Any site that contributes 15 – 49 pounds of phosphorus per year.

Priority 1 barnyards may receive assistance for barnyard runoff control practices and Priority 2 barnyards may receive assistance for barnyard runoff control practices with focusing first on clean water BMPs such as roof gutters, diversions, underground outlets or grass buffer areas. Assistance would reduce the phosphorus rating to less than 15 pounds of phosphorus per year or less than 5 pounds of phosphorus per year if located in a WQMA.

Compliance Determination

On-site evaluations will be the primary means of determining compliance with Chapter NR 151 requirements. On-site evaluations will be completed using a county and/or state evaluation form. The information in the evaluation form will be tracked using the county database and geographic information system. Landowners that have gone through the evaluation process will receive the following:

- Evaluation report with a landowner signature page.

- Instructions on appeal procedures if the landowner contests the evaluation.
- Recommendations for measures needed to achieve compliance.
- Schedule for achieving compliance with the standards.
- Applicable cost-share fund programming for installing recommended practices.

Information and Education
The Shawano County Land Conservation Department, along with UW-Extension and WDNR, will initiate an information and education campaign to inform all Shawano County farmers of the requirements of Chapter NR 151. This effort will be implemented as resources allow through local press releases, newsletters and county website and will attempt to voluntarily get landowners to comply with NR 151. The Land Conservation Department staff will also make direct contact with landowners during farm visits for other program purposes and inform them of NR 151 requirements.

Enforcement
The Shawano County Livestock Waste Management Ordinance was last updated in October 2015 and contains all state performance standards and prohibitions with the exception of Tillage Setback, Phosphorus Index and Process Wastewater. It is anticipated an update to the ordinance to include all standards and prohibitions will occur in the near future.

Should a landowner who is found to be out of compliance with state performance standards and prohibitions listed in the Shawano County Livestock Waste Management Ordinance refuse technical and financial assistance from Shawano County Land Conservation Department, they will be notified by mail that they are subject to enforcement actions pursuant to NR 151.09 and/or NR 151.095. Enforcement action will be followed through entirely within Shawano County through the Land Conservation Department and Corporation Counsel Office with notice being issued pursuant to NR 151.09(5) or (6), or 151.095(6) or (7).

Should a landowner who is found to be out of compliance with state performance standards and prohibitions not listed in the Shawano County Livestock Waste Management Ordinance refuse technical and financial assistance from Land Conservation Department (LCD), the LCD will forward all information corresponding to the infraction(s) to the WDNR for enforcement action.

The specific roles and responsibilities of Shawano County and state agencies in implementing these standards will be outlined in a Memorandum of Understanding (MOU) between the county and the Wisconsin Department of Natural Resources. This agreement will be used to assure compliance with the agricultural nonpoint performance standards and prohibitions under NR151 and NR243.

Appeals
Any person aggrieved by a decision of the Shawano County Land Conservation Department may file a written appeal of the decision to the Shawano County Land Conservation Committee, 311 N. Main Street, Shawano, WI 54166-2145 within 10 calendar days of the department's decision. The Shawano County Land Conservation Committee is empowered to hear and grant or deny appeals.

Cost-share Assistance
The Shawano County Land Conservation Department provides cost-share funding assistance to landowners installing best management practices through its Soil and Water Resource Management Program. Assistance rates and options may vary based on the source of funding for a given project.

To receive financial assistance, landowners must submit a completed Shawano County Cost-Share Grant Application to the Land Conservation Department and receive approval from the Land Conservation Committee. Landowners must also enter into a cost-share agreement. Cost-share agreements are binding documents that secure funds for installing best management practices. The administration of this cost share assistance program is the responsibility of the Shawano County Land Conservation Department. The department maintains participating landowner files in accordance with approved methods and practices for accounting and recording keeping. The department is also responsible for the monitoring of best management practices installed with cost share assistance to ensure proper operation and maintenance during the expected life of the practice.

The Land Conservation Department also follows a cost containment policy to equitably distribute the available cost-share funds. The cost containment policy uses a combination of procedures to accomplish its goal. Bidding, average costs and flat rates as well as maximum cost-share amounts are used to contain project costs.

Best Management Practices

This Plan identifies specific goals for pollutant load reductions to the water resources of Shawano County. The extent to which those goals are met depends primarily on the extent to which landowners implement the necessary Best Management Practices (BMPs) that effectively reduce or eliminate pollution sources. Land owners and operators will be encouraged to voluntarily implement needed conservation practices through I&E efforts as described in Chapter 6. Some of the BMPs will require expenditures for construction work, while others will require basic changes in techniques directly related to tillage practices, management (storage and disposal) of manure, application of commercial fertilizers, and land use activities adjacent to creeks, lakes, and rivers. The level of success in achieving goals for pollutant load reduction also depends on the extent that flexibility and innovation are used in the planning, design, and installation and adaptation of effective BMPs and land management practices. Every effort shall be made countywide during the planning, design, and installation of BMPs to prevent or minimize the loss of wildlife habitat.

Best management practices control nonpoint sources of pollution and can be used to help landowners meet minimum performance standards. Generally these practices use standard specifications included in the Natural Resources Conservation Service (NRCS) Field Office Technical Guide. In some cases additional specifications may apply.

The following is a list of Best Management Practices listed in ATCP-50 that are eligible to receive cost-share assistance under the Shawano County Soil and Water Resource Management Program:

- Manure Storage Systems
- Manure Storage System Closure
- Barnyard Runoff Control Systems
- Access Roads And Cattle Crossings
- Animal Trails And Walkways
- Contour Farming
- Cover And Green Manure Crop
- Critical Area Stabilization
- Diversions
- Feed Storage Runoff Control Systems
- Field Windbreaks
- Filter Strips
- Grade Stabilization Structures
- Heavy Use Area Protection
- Livestock Fencing
- Livestock Watering Facilities
- Milking Center Waste Control Systems
- Nutrient Management
- Pesticide Management
- Prescribed Grazing
- Relocating/Abandoning Animal Feeding Operations

- Residue Management
- Riparian Buffers
- Roofs
- Roof Runoff Systems
- Sediment Basins
- Sinkhole Treatment
- Streambank And Shoreline Protection
- Stream Crossing
- Strip Cropping
- Subsurface Drains
- Terrace Systems
- Underground Outlets
- Waste Transfer Systems
- Wastewater Treatment Strips
- Water And Sediment Control Basins
- Waterway Systems
- Well Decommissioning
- Wetland Development Or Restoration

Chapter 4 – Goals, Objectives and Actions

This chapter is a summary of the overall goals, objectives, and strategies to implement during the ten year time period of the plan. These were developed based on recommendations of the Citizen Advisory Committee, technical advisors, and analysis of existing conditions in Shawano County. The team developed an overall goal statement to represent what the work will strive to achieve long term for the community.

GOAL STATEMENT

Promote land use practices that maintain or improve soil, water, habitat quality and quantity while supporting a viable and diverse economic base in Shawano County.

The Work Plan includes action steps and measureable outcomes to be implemented by the Land Conservation Department as well as partner agencies. Throughout this process the County has consulted with partner agencies and County plans to ensure that these goals and objectives are in line with other established priorities. During the process the advisory committee identified priority areas:

OBJECTIVES

Objective 1: *Increase nutrient management to promote the efficient and effective management of nutrients on private lands.*

Objective 2: *Reduce soil erosion on agricultural and residential lands.*

Objective 3: *Increase restoration of shoreland and wetlands.*

Objective 4: *Reduce phosphorus loading to improve water quality.*

Objective 5: *Improve groundwater quality and quantity*

Objective 6: *Control invasive species and increase pollinator habitat*

Objective 7: *Improve woodland quality.*

Tracking of measurable outcomes will allow for ease of annual reporting to the state and county along with determining the successes and/or need for adjustments of the work plan activities. The work plan will be reviewed at the annual Progress Evaluation and Review meeting. Work Plan activities will occur throughout the 10 year timeframe of the plan with some noting an expected timing as listed in the activity or measurable outcome. An update to the activities outlined in the work plan will take place again in 5 years (2021). If there is a need to make changes sooner than 5 years, those revisions will be documented in a revised work plan provided to DATCP with the annual County Soil & Water Resource Management (SWRM) grant application.

Specific goals, objectives, strategies and activities are detailed in the Work Plan on the following pages. Items included may require additional staff and funding to complete. **Bolded** items represent program priorities and lead agencies.

Work Plan

Goal: Promote land use practices that maintain or improve soil, water, habitat quality and quantity while supporting a viable and diverse economic base.

Objective 1: Increase nutrient management to promote the efficient and effective management of nutrients on private lands.			
Strategy	**Activity**	**Measurable Outcome & Target Benchmarks**	**Responsible Party**
1. Increase number of acres with nutrient management plans to 65% of cropland acres over next 10 years.	**1. Work with partner agencies and nutrient management planners to promote the development and implementation of nutrient management plans**	Have updated list of certified crop consultants available for distribution; Number of landowner contacts made (50 contacts per year)	**UWEX**, **LCD**, DATCP, NRCS, DNR
	2. Work with nutrient management planners, partner agencies and landowners to encourage annual reporting of Nutrient Management Plan checklists to Land Conservation Department.	Number of acres reported increasing each year (Average 1,000 additional acres/year)	**LCD**, DATCP, UWEX, DNR, NRCS
	3. Follow up with farmers who have received County cost-sharing or a Shawano County Livestock Waste Management permit and have not filed a nutrient management plan checklist	Number of letters, phone calls, and on farm visits; Number of nutrient management plan checklists still to be received (10-25 contacts per year)	**LCD**
	4. Annually apply for and utilize Nutrient Management Cost Share funding from State	State grant funding awarded and percent of cost share fund utilized in a year.	**LCD**
	5. Promote cost sharing opportunities for Nutrient Management Plans through individual contacts, UWEX newsletter, and county web page.	Number of new signups in various programs; annual newsletter article; web page update	**LCD, NRCS, UWEX**
	6. Provide training for agricultural producers to develop and update nutrient management plans.	Annual training workshop; 5 new participants	**LCD, UWEX, DATCP**

2. Implement Priority Farm Strategy outlined in Chapter 3 for compliance with Performance Standards and Prohibitions identified in NR 151.	**1. Conduct site visits and/or reviews of 80-100 farms annually; verify 590 nutrient management plan checklist has been submitted**	Document the number of farm visits and/or reviews and status of plan compliance for annual DATCP reporting (25% of FPP participants; 5 complaints; 20 Livestock Waste Management Ordinance; 5 for cost share assistance)	**LCD**
	2.Work with Wisconsin DNR to coordinate farmer compliance with NR 151 standards and prohibitions	Completed MOU with DNR. Document the number of non-compliance violations coordinated with the WI DNR (5 farms per year)	**LCD, DNR**
3. Provide technical assistance for waste storage facilities or feedlot runoff control practices.	**1. Assist farms with manure management planning, design, construction, improvements, or closures**	5 to 10 farms assisted per year	**LCD**, NRCS
	2. Provide current technical, management and regulatory education to farmers in regards to manure handling, storage and application.	Number of landowners assisted, events and notifications (inform 50 – 100 landowners per year; one-two events and/or notices)	**LCD, NRCS, DNR, DATCP, UWEX**
	3. Work with NRCS, DATCP and WI DNR to review permitting and compliance requirements	Number of manure management BMP's designed and approved	**LCD**, NRCS, DATCP, DNR
4. Increase landowner participation in County, State and Federal conservation programs over next 10 years.	1. Work with partner agencies to provide education on conservation programing and encourage participation.	Number of education session held, contacts made, new practices added and new program participants	**LCD**, NRCS,DNR, UWEX
	2. Work with Maple Grove AEA to increase farmland preservation agreements and promote the AEA	Hold meetings with AEA stakeholder group; number of contacts made, new agreements signed and promotion items implemented	**PDZ. LCD**, DATCP, MG AEA
5. Continue to seek funding to provide cost-share assistance for eligible costs related to nutrient management planning	1. Pursue and secure funding opportunities through various state and federal progr251ams	Number of grant applied for/awarded; Participate in NE Farm & Forest Local Workgroup for EQIP funding priorities	**LCD, NRCS**
6. Provide nutrient management education to non-farm landowners.	1. Work with UWEX and DNR to offer nutrient management education to lake organizations each year.	Number of education sessions held; number of participants	**LCD,** UWEX, DNR,

	2. Inform contractors, developers and citizens about non-agricultural performance standards	Number of contacts made or education sessions held	**UWEX, LCD, DNR**
Objective 2: Reduce soil erosion			
Strategy	**Activity**	**Measurable Outcome & Target Benchmarks**	**Responsible Party**
1. Evaluate soil loss on an annual basis to establish baseline data.	**1. Conduct annual Tillage Transect Survey**	Complete Tillage Transect Survey and Soil Loss Data Reports annually	**LCD**
2. Provide technical assistance and cost sharing (if available) to landowners to implement Best Management Practices (BMP's)	**1. Offer technical assistance and cost sharing to landowners as requested.**	Offer technical assistance and/or cost sharing to 5–25 landowners per year	**NRCS, LCD**, UWEX
		5–25 BMP's implemented per year	**NRCS, LCD**
	2. Promote BMP's (cover crops, min-till, buffers, field borders, etc.) through educational events, one-on-one farm visits and information on county webpage	Number of contacts made (50-100 per year), education events held (one or two per year), BMP's installed (5-25 per year), county webpage (add 2-5 articles or links per year)	**LCD, UWEX**, NRCS, DNR
	3. Educate landowners on soil erosion performance standards through priority farm strategy, informational meetings and documents on webpage	Contact and make site visits with 75 landowners annually; add soil loss BMP's on LCD webpage (2-5 articles or links per year); other events (one or two per year)	**LCD**, UWEX, NRCS
	4. Conservation Planning and compliance checks on Highly Erodible Land (HEL) for provisions of the Food Security Act	Number of conservation plans updated and compliance checks completed	**NRCS**
3. Restore streambanks through voluntary efforts and programs	1. Promote shoreline and streambank BMP's through educational events, site visits and information on county webpage	Number of contacts made, education events held, BMP's installed	**NRCS, LCD, UWEX**, DNR

Objective 3: Restoration of shoreland and wetlands			
Strategy	**Activity**	**Measurable Outcome & Target Benchmarks**	**Responsible Party**
1. Recruit lakeshore property owners to participate in state Healthy Lakes initiative and County program.	**1. Promote establishment of rain gardens, native buffers, and runoff diversions**	Number of educational session held (one or two per year), contacts made (10-50 per year), practices installed (1-3 per year), county webpage (add 2-5 articles or links per year)	**LCD, DNR, UWEX, LO, UW Lakes, NRCS**
	2. Work with partners to provide education on benefits of Healthy Lakes practices	Number of educational sessions held, contacts made, practices installed; 10% of lakeshore properties in Shawano County implement projects	**LCD**, DNR, UWEX, LO, UW Lakes, NRCS
	3. Promote county, state and federal programs to assist landowners with technical and financial assistance	Contacts made, Annual article in UWEX newsletter; Create and update a webpage on Land Conservation Department web site; inform attendees at other educational events	**LCD, DNR, UWEX**, **UW Lakes, NRCS,** LO
2. Improve riparian habitat	**1. Promote and educate on riparian BMP's**	Number of contacts made (10-50 per year), education events held (one or two per year), BMP's installed (1-2 per year); info on County webpage (add 1-2 articles or links per year)	**LCD, NRCS, UWEX, PDZ, DNR, USFWS**
	2. Restore streambanks through voluntary efforts and programs	Number of contacts made, BMP's installed	**LCD, NRCS, PDZ, DNR, USFWS**
3. Provide technical assistance to Best Management Practices	1. Offer technical assistance to farmers and landowners if available or refer to private consultant	Number contacts made	**LCD, NRCS**, PDZ, DNR, USFWS
		Number of projects or acres implemented	**LCD, NRCS**, DNR, USFWS
4. Inventory wetlands to identify restoration opportunities	1. Collaborate with local governments and non-profits on inventory methods, evaluation and setting priorities	Number of technical assistance consultations	**LCD**, NRCS, PDZ, DNR, USFWS

	2. Work with governments and non-profits to quantify wetland gains and losses in the county	Network created to enable annual reporting	**LCD**, NRCS, PDZ, DNR, USFWS, Towns, DOT, Cty Hwy
	3. Promote alternative practices to improve wetlands or construct wetlands (tile outlets, WASCOB, etc.)	Install a demonstration project and hold educational event	**UWEX, LCD**, NRCS, DNR, USFWS
Objective 4: Reduce Phosphorus loading			
Strategy	**Activity**	**Measurable Outcome & Target Benchmarks**	**Responsible Party**
1. Focus on Best Management Practices (BMP's) for farmsteads	**1. Promote county, state and federal programs to assist landowners with technical and financial assistance**	Contacts made (50-150 per year), article in UWEX newsletter (1-2 per year); Create and update a info on Land Conservation Department web site (1-4 articles per year) and links to other partner websites (1-5 per year); inform attendees at other educational events (1-4 per year)	**LCD, NRCS, DNR, UWEX**
	2. Promote farmstead BMP's through educational events, one-on-one farm visits and information on county webpage	Contacts made (50-150 per year), article in UWEX newsletter (1-2 per year); Create and update a info on Land Conservation Department web site (1-4 articles per year) and links to other partner websites (1-5 per year); inform attendees at other educational events (1-4 per year)	**LCD, NRCS, UWEX,** DNR
	3. Enforce County Livestock Waste Management Ordinance and provide technical assistance to landowners	Technical assistance or consultations provided (5-10 per year)	**LCD**, NRCS, DNR, UWEX
		Number of BMP's implemented (3-5 per year); Number of permits issued (15-30 per year)	**LCD, NRCS**, DNR, UWEX

	4. Promote positive efforts of farmers to reduce runoff pollution	Recognition of Soil & Water Conservation Farmer Award recipient at annual county Agricultural Awards Banquet (one presentation per year)	**LCD**, NRCS, UWEX
2. Through nutrient management planning and implementation	**1. Work with partner agencies and nutrient management planners to promote the development and implementation of nutrient management plans**	Number of new signups in various programs (3-5 per year); UWEX newsletter article (1-2 per year); keep nutrient management info current on county webpage	**LCD, NRCS, UWEX, DATCP**
	2. Work with landowners to meet Agricultural Performance Standards and Prohibitions	Contacts made (50-100 per year), technical assistance provided (5-10 per year), BMP's implemented (3-5 per year)	**LCD**, NRCS, DNR, UWEX
3. Prepare for, explore opportunities of and utilize Upper Fox - Wolf Watershed TMDL	1. Work with DNR on development of TMDL	Participation in requests from DNR	**DNR**, LCD, NRCS, UWEX, DATCP
	2. Determine role of Land Conservation Department in TMDL implementation and focus 9-Key Element planning on impaired watersheds	Meetings with partners held, opportunities identified	**LCD**, DNR, NRCS,

Objective 5: Improve Groundwater quality			
Strategy	**Activity**	**Measurable Outcome & Target Benchmarks**	**Responsible Party**
1. Protect groundwater from contamination	**1. Identify and inventory direct conduits to groundwater**	Consulted partners and developed procedure by end of 2017	**LCD**, NRCS, DNR, TNC
		Determined priority locations for identification and conduct inventory by end of 2019	**LCD**, NRCS, UWEX, DNR
	2. Offer technical assistance and cost sharing for well decommissioning	Number of landowners technical assistance or consultation provided (5-10 per year)	**NRCS, LCD**, UWEX, DNR
		Number of well decommissions implemented (1-3 wells per year)	**NRCS, LCD**, UWEX, DNR
	3. Promote county, state and federal programs to assist landowners with technical and financial assistance	Contacts made, Annual article in UWEX newsletter; Create and update a webpage on Land Conservation Department web site; inform attendees at other educational events	**NRCS, LCD, SMHD, UWEX, DNR**
	4. Promote well water testing	Number of contacts made, education events held, wells tested; information on County webpage	**LCD, SMHD, UWEX**, DNR, NRCS,
	5. Education and implementation of NR 151 and 590 standard	Contact and make site visits with 75 landowners annually; create and update LCD webpage; Contacts at other events throughout the year	**LCD**, NRCS, UWEX, DNR
2. Increase water quality monitoring of groundwater resources	1. Pursue and secure funding opportunities for well water testing	Inquiries made; Number of grants applied for/awarded	**LCD**, UWEX
	2. Work with state and local partners to create and maintain a database of private wells and well water testing data	Contacts made, information obtained, database developed	**UWEX**,LCD

Objective 6: Control invasive species and increase pollinator habitat			
Strategy	**Activity**	**Measurable Outcome & Target Benchmarks**	**Responsible Party**
1. Manage aquatic and terrestrial invasive species	**1. Coordinate programming and activities with Timberland Invasive Partnership**	Educational events (2-5 per year), one-on-one contact with landowners (5-10 per year), contact with groups (2-5 per year)	**LCD**, TIP, LO
	2. Implementation of Shawano County Invasive Species Management Plan	Actions worked on or completed in plan	**LCD, TIP**, LO, DNR, CHD
	3. Work with county lake organizations (Districts, Associations, etc.) and WI DNR to: develop and implement lake management plans; actively participate in WI DNR Clean Boats Clean Waters (CBCW) monitoring program; form a county/area wide waterways association; attend WI Lake Leaders Institute	Meetings attended; issues addressed; letters of support provided; number of lakes with lake management plans; number of public access lakes with trained CBCW monitors; formation of county/area wide waterways association by 2017; 5 additional lakes attend WI Lake Leaders Institute by 2026	**LO**, **DNR,** LCD, TIP
2. Increase pollinator habitat	1. Work with partners to promote opportunities and participation in EQIP	Number of contacts made, education events held, BMP's installed; information on County webpage	**NRCS**, LCD, UWEX, DNR
	2. Work with partners to promote native wildflower plantings	Number of contacts made, education events held, BMP's installed; information on County webpage	**UWEX**, NRCS, LCD, DNR, LO

Objective 7: Improve woodlands			
Strategy	**Activity**	**Measurable Outcome & Target Benchmarks**	**Responsible Party**
1. Promote proper forestry management BMP's	**1. Implementation of the Shawano County Forest Stewardship Management Plan**	Implement annual planned activities in 25 year (2013-2038) plan	**LCD**
	2. Encourage landowners to consult professional foresters (DNR, Town, City, Private)	Number of contacts and referrals made	**LCD, NRCS, UWEX, DNR**
	3. Promote use of county owned tree planters	Number of contacts made and tree plater rentals; information on County webpage	**LCD, DNR**
	4. Work with partners to promote opportunities and participation in various forestry programs	Number of contacts made, education events held, BMP's installed; information on County webpage	**NRCS, LCD**, UWEX, **DNR**
	5. Promote positive efforts of others in forest management	Recognition of Tree Farmer Award recipient at annual county Agricultural Awards Banquet; Submit nominations for other agency or organization awards	**DNR, LCD**
	6. Provide information and education on invasive species	Number of contacts made, education events held, information on County webpage	NRCS, LCD, UWEX, **DNR, TIP**

Acronyms:	
CHD - Shawano County Highway Department	PDZ - Shawano County Planning, Development & Zoning Department
DATCP - Department of Agriculture Trade & Consumer Protection	SMHD - Shawano/Menominee Health Department
DNR - Department of Natural Resources	TIP - Timberland Invasives Partnership
DOT - Department of Transportation	TMDL - Total Maximum Daily Load
LCD - Shawano County Land Conservation Department	TNC - The Nature Conservancy
LO - Lake Organizations	USFWS - United States Fish & Wildlife Service
MG AEA - Maple Grove Agricultural Enterprise Area Workgroup	UW Lakes - University Wisconsin Extension Lakes
NRCS - Natural Resource Conservation Service	UWEX - University of Wisconsin Extension

Implementation Budget Estimate

An annual estimated budget for the 2016-2026 work plan is outlined here. In estimating the budget, it is presumed that the county will continue to staff the Land Conservation Department at its current (2016) level of 3.5 persons. It is further presumed that DATCP and DNR will maintain their financial support for staffing of local conservation personnel and projects. The amounts in the DNR column are staff support costs for the Wildlife Damage, Abatement and Claims Program and technical assistance staff support costs for Targeted Runoff Management grant projects. The amounts in the cost share column are for DATCP Soil & Water Resource Management grants and Targeted Runoff Management grants.

YEAR	COUNTY	DATCP	DNR	COST SHARE	TOTAL COST
2016	$ 129,400	$ 111,500	$ 7,700	$ 176,640	$ 425,240
2017	$ 133,500	$ 113,200	$ 4,800	$ 186,500	$ 438,000
2018	$ 140,400	$ 110,000	$ 4,900	$ 36,500	$ 291,800
2019	$ 144,800	$ 110,000	$ 5,000	$ 36,500	$ 296,300
2020	$ 145,600	$ 110,000	$ 8,100	$ 136,500	$ 400,200
2021	$ 152,450	$ 110,000	$ 5,200	$ 36,500	$ 304,150
2022	$ 156,400	$ 110,000	$ 5,300	$ 36,500	$ 308,200
2023	$ 157,400	$ 110,000	$ 8,400	$ 175,000	$ 450,800
2024	$ 164,450	$ 110,000	$ 5,500	$ 36,500	$ 316,450
2025	$ 168,550	$ 110,000	$ 5,600	$ 36,500	$ 320,650
2026	$ 169,700	$ 110,000	$ 8,700	$ 175,000	$ 463,400

Chapter 5 – Regulations for Plan Implementation

Certain land use and land management activities are known to impair surface and groundwater resources. The challenge is to determine at what point those activities begin to adversely impact the resource. Debate on this issue has resulted in a call for minimum performance standards relating to land use activities.

The Wisconsin Department of Natural Resources (WDNR) and the Department of Agriculture, Trade and Consumer Protection (DATCP) have developed administrative rules, including NR 151 and ATCP 50 respectively, that contain performance standards for agricultural and non-agricultural nonpoint sources of pollution. Shawano County has also revised its Livestock Waste Management ordinance in 2006 to incorporate the ATCP 51 Livestock Siting Rule. The NR 151 Local Implementation Strategy and enforcement process are identified in Chapter 3 of this plan.

State Regulations

The following State regulations are important for the protection of natural resources in Shawano County:

- Department of Natural Resources – Chapter 30, WI Stats – Navigable Waters
- Department of Natural Resources – Chapter 281, WI Stats – Water and Sewage
- Department of Natural Resources – Chapter 283, WI Stats – Pollution Discharge Elimination
- Department of Natural Resources – WI Administrative Code NR 115 – Wisconsin's Shoreland Protection Program
- Department of Natural Resources – WI Administrative Code NR 151 – Runoff Management
- Department of Natural Resources – WI Administrative Code NR 216 – Stormwater Discharge Permits and Construction Site Erosion Control
- Department of Natural Resources – WI Administrative Code NR 243 – Animal Feeding Operations
- Department of Agriculture, Trade & Consumer Protection – Chapter 91, WI Stats – Farmland Preservation
- Department of Agriculture, Trade & Consumer Protection – Chapter 92, WI Stats – Soil and Water Conservation and Animal Waste Management
- Department of Agriculture, Trade & Consumer Protection – ATCP 48, Drainage Districts
- Department of Agriculture, Trade & Consumer Protection – ATCP 49, Farmland Preservation
- Department of Agriculture, Trade & Consumer Protection – ATCP 50, Soil and Water Resources Management Program
- Department of Agriculture, Trade & Consumer Protection – ATCP 51, Livestock Siting

Construction Site Erosion Control and Stormwater Management

The County will strive to have developments greater than one acre adhere to NR 216. Under subchapter III of NR 216, Wis. Adm. Code, a notice of intent shall be filed with the DNR by any landowner who disturbs one or more acres of land. This disturbance can create a point source discharge of stormwater from the construction site to waters of the state and is therefore regulated by DNR. Agriculture is exempt from this requirement for activities such as planting, growing, cultivating and harvesting of crops for human or livestock consumption and pasturing or yarding of livestock as well as sod farms and tree nurseries. Agriculture is not exempt from the requirement to submit a notice of intent for one or more

acres of land disturbance for the construction of structures such as barns, manure storage facilities or barnyard runoff control systems. (See s. NR 216.42(2), Wis. Adm. Code.) Furthermore, construction of an agricultural building or facility must follow an erosion and sediment control plan consistent with s. NR 216.46, Wis. Adm. Code and including meeting the performance standards of s. NR 151.11, Wis. Adm. Code.

Farmland Preservation

The Wisconsin Farmland Preservation Program provides income tax credits to Wisconsin farmers in exchange for keeping land in agricultural use and maintaining compliance with soil and water conservation requirements. The specific requirements are listed in ATCP 50, Wis. Admin. Code. According to the WI Department of Revenue 250 landowners in Shawano County claimed the Farmland Preservation tax credit in 2014.

Shawano County has a long history of protecting farmland through zoning over the past 35 years. The Maple Grove Agricultural Enterprise Area (AEA) was approved in 2010. The county Farmland Preservation Plan was re-certified by DATCP in 2013 (see Map in Appendix C).

The LCD has been working with DATCP staff to help direct program participants to the county. A recent development of requiring a unique number for each claimant along with an annual report submitted to DATCP from the county beginning with the 2016 tax year will be a huge help in identifying those landowners the county needs to review for compliance.

The LCD is required to monitor conservation compliance on the entire farm for program participants every 4 years. The LCD is grouping program participants (approximately 25% in each group) primarily by location to increase efficiency and reduce staff travel for their 4 year rotations. The deadline for issuing Certificates of Compliance with the 2002 performance standards has been extended to December 31, 2016. Farms not in compliance by this deadline will be issued a Notice of Non-compliance. Compliance with the 2012 performance standards begins in January 1, 2016 and goes for 5 years. LCD staff will revise their compliance review forms and begin checking compliance with the 2012 performance standards in 2016. The option of a Performance Schedule will be utilized for those landowners agreeing to the schedule.

Local Regulations

The following County regulations are important for the protection of natural resources in Shawano County:

- Livestock Waste Management Ordinance, No. 3-06
- Shoreland Zoning Ordinance
- Floodplain Ordinance
- Non-Metallic Mining Reclamation Ordinance
- Health, Junk and Environmental Hazard Ordinance

Livestock Waste Management Ordinance

All farms need to adhere to the following performance standards and prohibitions:

1) Follow a nutrient management plan designed to limit entry of nutrients into state waters (groundwater and surface water).
2) Repair or upgrade a failing or leaking manure storage structure that poses an imminent health threat or that violates groundwater standards.
3) Close a waste storage structure that is no longer needed according to accepted standards.
4) Meet technical standards for a newly constructed or substantially altered waste storage structure.

Additional requirements include:

1) Livestock facilities with more than 1,000 animal units require a Wis. Pollution Discharge Elimination System (WPDES) Permit and a Shawano County Livestock Waste Management Permit (conditional use).
2) Livestock operations, having more than 250 animal units are required to obtain a Shawano County Livestock Waste Management Permit when expanding more than 20% of its animal units, installing an animal housing building or outside lot, feed storage facility, waste storage or abandoning a waste storage. All operations must obtain an Animal Waste Management permit when altering or building a manure storage system or abandoning a manure storage system.

Shawano County Soil & Water Conservation Policy

Established pursuant to s. 92.14, Wisconsin Statutes, it provides for a soil and water conservation standard that requires all participants in the Farmland Preservation Program, who claim a tax credit, to reduce and maintain soil erosion on all participating cropland at levels no greater than T-value on individual crop fields. Established pursuant to Chapter NR 151.02 WI Administrative Code, it establishes a Sheet, rill and wind erosion performance standard to which all land where crops or feed are grown, including pastures, shall be managed to achieve a soil erosion rate equal to or less than the "tolerable" (T) rate established for that soil. Since this Policy remains in effect, "T"-value is the minimum performance standard regarding soil erosion from agricultural land in Shawano County. It must be reiterated that the pollutant reduction objectives identified in this Plan will not be achieved by a singular reliance on "T"-value, since it is predominantly related to soil productivity. Measurement of sediment and phosphorus delivery into receiving waters and sediment and phosphorus load reduction to those receiving waters are the most credible means to measure the extent to which the objectives are being achieved.

Chapter 6 – Information & Education Strategy

Information and education strategies are imperative to the success of reaching the goals and objectives of the Land and Water Resource Management Plan. Providing adequate opportunities for landowners, residents, and youth to engage with natural resources topics will allow for a broader understanding and ultimately adoption of best management practices. It will be important to work with the UW-Extension staff to accomplish these strategies.

The I & E Strategies in this plan will leverage local partnerships to provide education and information to promote the implementation of Best Management Practices (BMPs). This will include specific workshops and field days with farmers and interest groups, awareness through media and newsletters, and one-on-one consultations. Ultimately strategies will encourage individuals to participate in cost sharing programs and improve compliance with state and local standards. Primary partners throughout these efforts include Shawano County Land Conservation Department, UW-Extension, DNR, NRCS, FSA and other agencies and local groups.

Throughout the Work Plan specific areas have been identified as to which topics education is needed on in the community. Partnering on these initiatives will allow for the greatest impact in the community. The I & E Strategy contains activities designed to disseminate information throughout the county in order to address skills and information gaps.

Key Strategies

Several key strategies will be employed including:

1) Personal Consultations
2) Workshops or training
3) Written materials and publications

The primary source will come through personal consultations that occur with landowners. Often this will entail the landowner being eligible to participate in a cost sharing program to enhance their efforts to implement BMPs. Cost-sharing is meant to ease the financial risks associated with certain BMP's. Implementation of this strategy is intended to build awareness about local runoff pollution problems and encourage residents and landowners to adopt Best Management Practices (BMP's) to reduce nutrient and sediment loading.

Secondly, workshops and trainings will be held in conjunction with local partners, particularly UW-Extension. These will primarily target the agricultural community to address land management techniques. In order to address skill barriers, demonstrations, field days, and one-on-one instruction are planned. Additional resources will be available to conservation groups, lake management associations, and other organizations as requested.

The third I & E Strategy focuses on written materials and publications designed to disseminate information throughout the county. Some examples could include newsletters, direct mail, media coverage, or informational articles. Written publications will be available online as well as through articles in the local UW-EX newsletters. The Land Conservation Department will have information available on its website as well as local partner agencies.

The LCD and LCC are also involved with many organizations and activities which provide opportunities to share information and gain knowledge. They include: working with Area and State conservation associations to coordinate a multi-County and/or State approach to conservation programming; attending and participating in Lumberjack Resource Conservation and Development (RC&D) Council meetings; attending and participating in Lake Michigan Land + Water Conservation Association area meetings; supporting and attending Wisconsin Land + Water Conservation Association meetings / annual conference; attending County Lake District/Association meetings; attending and participating in the Timberland Invasives Partnership (TIP) meetings; attending DNR and NRCS trainings and meetings.

The Information and Education component of this plan will be reviewed annually as part of the Progress Review and Evaluation meeting. Adjustments in program delivery may be needed depending on the evaluation results. All information and education activities will be summarized and included in the LCD's annual accomplishment report to DATCP.

Chapter 7 - Coordination

Managing the county's natural resources is a team effort, and we rely on other partners for assistance and support. The goals, objectives, strategies and activities outlined by this plan will be achieved primarily through integrating this plan with the continued implementation of available local, state and federal programs. The LCD will make efforts to coordinate program implementation with other cooperating agencies. In administering its land conservation programs, the county will also work cooperatively with the local municipalities that choose to plan and manage land use within their respective jurisdictions. In conjunction with these public efforts, the county will work cooperatively with individual volunteers and private nonprofit conservation organizations to pursue land conservation objectives.

To clearly define the relationship with resource management partners, memorandums of understanding or local working agreements are often developed. These documents help define the roles of each partner, and clearly define what is expected from everyone involved. The Shawano County LCD has negotiated an Operational Agreement with the NRCS and will consider entering into such agreements with other partner agencies and departments.

There are numerous programs available to landowners to help them comply with the NR 151 requirements established by the DNR. Some programs provide technical and planning services while some offer financial assistance. Some programs are regulatory and may require compliance with NR 151 requirements through indirect means. Land Conservation Department staff will encourage landowners to utilize these programs wherever applicable. Many current programs are listed below:

State Programs

Priority Watershed Program
Pensaukee River Watershed Project completed was completed in 2008 under the priority watershed program. The Land Conservation Department will continue to monitor the practices that were installed and/or implemented. The existing Pensaukee River Priority Watershed Plan is considered as a qualifying 9-Key Element Plan through 2018. The LCD anticipates selecting a portion of this watershed for continuing 9-Key Element Plan approval through EPA.

Soil and Water Resource Management Program
The Wisconsin Department of Agriculture, Trade and Consumer Protection provides cost-share assistance and staffing grants to County Land Conservation Departments to implement the Land and Water Resource Management Plan.

Targeted Runoff Management (TRM)
These are grants administered by the DNR for control of nonpoint source water pollution. The Land Conservation Department and Committee will prioritize areas of the County where the need is most and cooperation of the citizens will ensure implementation of BMPs using these grant funds. Shawano Lake Watershed and the Long Lake – Schoenick Creek Watershed are priority areas.

Notice of Intent (NOI) / Notice of Discharge (NOD)
These grants are provided to local units of government (typically counties) by the DNR. The purpose of these grants is to provide cost sharing to farmers who are required to install agricultural best management practices to comply with Notice of Discharge requirements. Notices of Discharge are

issued by the DNR under Chapter NR 243 (Animal Feeding Operations) to small and medium animal feeding operations that pose environmental threats to state water resources. The project funds can be used to address an outstanding NOD or an NOD developed concurrently with the grant award.

Watershed–Based Trading and Adaptive Management
Planning began in 2014 on the development of total maximum daily loads (TMDLs) for total phosphorus (TP) and total suspended sediments (TSS) for impaired waters located in the Upper Fox Basin and the Wolf River Basin. To the extent possible, regarding specific opportunities within Shawano County, watershed–based trading will be pursued through the Total Maximum Daily Load (TMDL) process if and when it is initiated. In accordance with Sec, 303(d) of the Clean Water Act and U.S. EPA regulations, states are required to develop TMDLs for waters not attaining quality standards after pollution control requirements have been implemented. Simply stated, TMDLs provide a means, within a watershed or basin, to identify the amount of pollutant reductions needed from point source dischargers and nonpoint sources so that a waterbody can meet water quality standards.

Water quality trading and adaptive management are two compliance options available to point source discharges to comply with their permit limits. Adaptive management is limited to phosphorus, water quality trading can also be used for other pollutants such as total suspended solids. These watershed-based options allow the dischargers to allocate funds for nonpoint source pollution abatement in return for, and as part of regulated and accountable methods to meet a particular water quality standard. To the extent possible, regarding specific opportunities within Shawano County, watershed–based trading and/or adaptive management will be pursued through the Total Maximum Daily Load (TMDL) process if and when the analysis is completed.

Wisconsin Lakes Management Program
The Wisconsin Lakes Management Program is a cooperative program between the DNR, UW-Extension, Wisconsin Lakes (WL), and lake organizations to assist management and protection of their lakes. The Wisconsin Lakes Management Program provides technical assistance, information and education to lake groups and lake residents, and planning, protection, and implementation grants to qualified lake organizations and local units of government.

The Citizen Lake Monitoring Network (CLMN) creates a bond between 1000+ citizen volunteers statewide and the Wisconsin Lakes Partnership. CLMN staff provide volunteers with the necessary equipment and training to conduct these monitoring activities. Volunteers provide their time, expertise, energy, and a willingness to share information with their fellow lake residents or other lake users. The information gathered by these monitoring programs is used by Wisconsin Department of Natural Resources and university biologists and researchers, UW-Extension, and other interested individuals.

Lake Management Planning Grant Program
The Wisconsin Lake Management Planning Grant Program was developed to provide financial assistance to qualified lake organizations or local governments to collect and analyze data concerning the physical, chemical and biological health of their lakes. Grant money can also be used to investigate watershed conditions, review ordinances and conduct social surveys to gauge local concerns and perceptions as they relate to lake use and water quality. The end product of most lake management planning grants is a comprehensive lake management plan which addresses local concerns and analyzes alternatives for lake and watershed management.

Lake Protection Grant Program
Through the Lake Protection Grant Program qualified lake organizations can apply for funds to carry out a variety of lake protection projects. The state-share is 75%. Eligible projects include the purchase of lands critical to a lake ecosystem, restoration of important wetlands and the development of regulations and ordinances designed to protect and enhance water quality.

Aquatic Invasive Species Education, Prevention and Control Grants
Funding provided by the DNR to help prevent and control the spread of aquatic invasive species in the state.

Managed Forest Law (MFL)
The goal of the Managed Forest Law (MFL) program is to encourage long-term sound forest management. MFL is a tax incentive program for industrial and non-industrial private woodland owners who manage their woodlands for forest products while also managing for water quality protection, wildlife habitat and public recreation. In return for following an approved management plan, property taxes are set at a lower rate than normal.

Phosphorus Multi-Discharge Variance
In 2013 through the enactment of Act 378 a multi-discharge variance (MDV) extends the timeline for complying with low-level phosphorus limits. In exchange, point sources commit to step-wise reductions of phosphorus within their effluent as well as helping to address nonpoint sources of phosphorus farm fields, cities or natural areas to implement projects designed to improve water quality.

Wisconsin Forest Landowner Grant Program (WFLGP)
This program is designed to assist private landowners in protecting and enhancing their forested lands, prairies, and waters. The program allows qualified landowners to be reimbursed up to 65% of the eligible practices such as Management plan development, Tree Planting, Forest improvement, Soil & water protection, Wetland work, Stream bank improvement, and Wildlife habitat work.

County Conservation Aids
Funding provided by the DNR to enhance county fish and wildlife programs.

Wildlife Damage, Abatement and Claims Program
The Wildlife Damage, Abatement and Claim Program provides abatement and claim assistance to landowners receiving wildlife damage. The damage must be caused by deer, bear, geese, or turkeys to commercial seedlings, orchard trees, agricultural crops, nursery stock, apiaries or livestock. Landowners are eligible for abatement practices such as fencing, shooting permits, cannons, etc. Landowners may be reimbursed for their crop losses up to a maximum cap. The Land Conservation Department Administers this program in Shawano County in cooperation with Department of Natural Resources staff.

River Protection Planning Grants
Funding provided by the DNR to protect and improve rivers and their ecosystems.

Streambank Protection Program
Funding provided through the Knowles-Nelson Stewardship Program to provide public fishing access to Wisconsin's streams and foster habitat projects to improve fish habitat and water quality. The DNR

purchases streambank easements from willing landowners. A Northeast Wisconsin Focus Area has recently been established and includes much of Shawano County.

Federal Programs

Conservation Reserve Program (CRP)
The Conservation Reserve Program was developed to assist landowners in voluntarily converting highly erodible and environmentally sensitive cropland from the production of annual crops to less intensive uses such as permanent grass, legumes, forbs, wildlife cover or trees. General sign-up for the program occurs only at announced time periods that are determined by USDA. Regular sign-up, in most cases, involves offers of entire fields. Sign up is taken at the Farm Service Agency.

Continuous sign-up is primarily for small areas of environmentally sensitive land. The sign-up is ongoing and covers priority practices such as filter strips, riparian buffers, shelter belts, field windbreaks, grassed waterways and shallow water areas for wildlife.

Conservation Reserve Enhancement Program (CREP)
The Conservation Reserve Enhancement Program is a joint, state-federal land retirement conservation program targeted to address State and nationally significant agriculture-related environmental effects. This voluntary program uses financial incentives to encourage farmers and ranchers to enroll in contracts of 15 years in duration to remove lands from agricultural production. It is authorized pursuant to the 1996 Federal Agriculture Improvement and Reform Act.

Environmental Quality Incentives Program (EQIP)
The intent of the EQIP program is to provide a voluntary conservation program for farmers who face serious threats to soil, water and related natural resources. The program provides technical, financial and educational assistance.

Wetland Reserve Program (WRP)
The Wetland Reserve Program is a voluntary program established to help landowners restore and protect wetlands on their property. To be eligible, land must have been drained for farming or pasture that is possible to be restored to natural wetland conditions. Land adjacent to restorable acreage is also eligible if it contributes to wetland functions and values.

Wildlife Habitat Incentives Program (WHIP)
This program is designed to develop or improve wildlife habitat on privately owned land using such practices as seeding, fencing, in-stream structures, etc. Almost any type of land is eligible, including agricultural and non-agricultural land, woodlots, pastures and stream banks.

The Conservation Security Program (CSP)
This is a voluntary conservation program that supports ongoing stewardship of private agricultural lands by providing payments for maintaining and enhancing natural resources. CSP identifies and rewards those farmers and ranchers who are meeting the highest standards of conservation and environmental management on their operations.

Partners for Fish and Wildlife Program
US Fish and Wildlife Service Program used in Wisconsin to assist in wetland restoration, fish and wildlife habitat improvement, and restoration of habitats of special concern.

County Programs and Ordinances

Shawano County Livestock Waste Management Ordinance
Administered by the Shawano County Land Conservation Department to regulate the location, design, construction, installation, alteration, operation, maintenance and use of livestock facilities (including livestock siting), waste storage facilities and the application of waste and manure.

Shawano County Lakes and Streams Program
The purpose of this program is to educate lake users and shore land owners to protect and enhance water quality and aquatic habitat through awareness, notification of poor practices, technical assistance and possible funding of conservation practice implementation. LCD staff will coordinate use and maintenance of educational kiosks at public boat landings throughout the county. When concerns are detected staff will work with the appropriate landowner, lake association, lake district, UWEX, DNR or other appropriate agency/organization to abate problems associated with water quality, aquatic habitat and invasive species through planning, technical assistance and possible grant funding.

Shawano County has established a Shoreline Restoration Program. The LCD has secured cost-share funding for shoreline restoration and rain gardens through the Shawano County Capital Improvement Program. The majority of this program will be focused within the Shawano Lake watershed. The Shawano Lake watershed contains Shawano, Bahr, Korth, Lily, Loon, Lulu, Washington, and White Clay Lakes, their tributaries, and all lands draining into these waterways. The need for improved stormwater management and shoreland restoration is applicable to all areas within Shawano County. Project proposals outside the Shawano Lake watershed will be accepted for consideration based on their merits and overall needs. Where feasible, projects will be implemented outside of the Shawano Lake watershed. Emphasis will be placed on shoreland restoration projects on the shoreline of Shawano Lake where-ever possible.

Shawano County Shoreland Zoning Ordinance
Shawano County Planning, Development and Zoning Department administers this ordinance that regulates activities within shoreland zone (areas within 1,000 feet of lakes, ponds, flowages and areas within 300 feet of navigable rivers and streams).

Shawano County Farmland Preservation Plan
Conservation compliance is administered by the Land Conservation Department. The plan was updated and re-certified in 2013 and allows farmers to receive tax credits for meeting Wisconsin Farmland Preservation Program requirements including conservation compliance. The LCD will continue to work with program participants to achieve compliance. The Maple Grove Agricultural Enterprise Area was established in 2010.

Shawano County Non-Metallic Mining Reclamation Ordinance
Administered by the Shawano County Planning, Development and Zoning Department and East Central Wisconsin Regional Planning Commission to ensure the effective reclamation of non-metallic mining sites in the county.

Shawano County Forest Stewardship Management Plan
Administered by the Land Conservation Department this 25-year plan was adopted in 2013 to implement sound resource management practices on 528 acres of county owned woodlands which recognize the objectives for aesthetics, ecological diversity, maintaining ecosystem functions, wildlife

habitat, erosion control, protection of endangered or threatened plants and animals, compatible recreational activities and economic returns.

Shawano County Invasive Species Strategic Management Plan
Administered by the Land Conservation Department this plan was adopted in 2013 and outlines approaches and supporting tasks that can be used to prevent the spread of AIS. The plan attempts to complement existing efforts approved by the Wisconsin Department of Natural Resources and local lake organizations in Shawano County. This is the initial step in establishing a county-wide approach to coordinate the prevention, control, and possible elimination of certain AIS within Shawano County watersheds.

Other Partners

1) Lumberjack Resource Conservation & Development (RC & D) Council
2) Timberland Invasives Partnership
3) Area and county conservation/sportsmen's organizations
4) Lake Districts and Associations
5) Local units of government

The Shawano County Land Conservation Department will spearhead efforts to coordinate program implementation with other cooperating agencies.

Chapter 8 – Monitoring and Evaluation

The LWRM plan is intended to be a working document that will be reviewed annually to track progress in accomplishing the goals and actions of the Work Plan. This will be accomplished by regularly measuring and evaluating the extent to which the goals are being achieved. It is through this process that necessary adjustments and revisions in the plan goals and objectives can be made.

The evaluation process includes the following components:

- Performance Standards and Prohibitions Monitoring
- Pollutant Load Reduction Measurements
- Administrative Reporting
- Water Resource Monitoring

Performance Standards and Prohibitions Monitoring

LCD is committed to assisting landowners with maintaining practices to meet NR151 Performance Standards and Prohibitions. Ongoing compliance monitoring will be the primary activity to address sites that receive public complaints alleging non-compliance as well as to stay in maintain compliance with the Farmland Preservation Program. Shawano LCD's goal is to annually monitor farms with agricultural best management practices under a current operation and maintenance plan.

The process has begun to upgrade computer software for land records, permitting and Farmland Preservation. This upgrade will aid in the tracking of conservation compliance for Farmland Preservation Program participants by land parcel. In the future it is anticipated that this software to track all other compliance with NR151. Another goal is to utilize GIS technology as a tool to track and monitor landowner compliance with the performance standards and prohibitions. In addition, all data regarding landowner compliance with the performance standards and prohibitions will be kept either in digital or hard copy format in the landowner file.

Pollutant Load Reduction Measurements

Installation of all applicable Best Management Practices, regardless of program, requires close communications with cooperating agencies to accurately track the installation and associated pollutant load reduction of those particular BMPs.

The methods to be used to provide quantitative measurements of pollutant load reduction are:

Cropland Sources – When an adequate sediment delivery model is developed, it will be used throughout the implementation process. Planning began in 2014 on the development of total maximum daily loads (TMDLs) for total phosphorus (TP) and total suspended sediments (TSS) for impaired waters located in the Upper Fox Basin and the Wolf River Basin. Part of the TMDL analysis includes an evaluation of current agricultural practices so that phosphorus and sediment loads can be evaluated using the SWAT watershed model. Snap+ includes a "P Trade Report" that estimates field-specific annual pounds of phosphorus in surface runoff from cropland entering surface waters. This report may be used to support water quality trading efforts. The LCD will also conduct annual Tillage Transect Surveys to track changes in tillage, cropping practices and soil erosion rates by watershed and county wide.

Shoreline and Stream-bank Sources – The Land Conservation Department tracks the extent and location of shoreline and stream-bank protection projects it provides technical assistance. Detailed figures on sediment and phosphorus load reductions will be obtained from those particular projects. Tracking of permits for shoreline and stream-bank erosion control work will also be utilized to assist in evaluating all sites where protection practices are installed.

Livestock Waste Management – The BERT, BARNY or most current model will be used to estimate phosphorus loading reductions from installed barnyard and feedlot runoff control systems. A method is needed that will estimate phosphorus loading reductions from the implementation of nutrient management practices.

In cooperation with DATCP, Shawano County will monitor and measure nutrient management progress by tracking plan checklists and updating county GIS layer of acres with nutrient management plans. Farmer workshops will continue to be conducted for landowners to develop/update their own nutrient management plans on SNAP+ software.

Administrative Reporting

As required, Shawano County LCD will report to DATCP and DNR on progress towards implementation of the performance standards and prohibitions as well as other soil and water resource program activities. Every year the LCD also produces an annual accomplishment report that gives updates on county programs as well as lists of achievements, statistics, highlights and goals for the next year. In addition, DATCP and NRCS conduct annual engineering and conservation planning spot checks to ensure compliance with all applicable technical standards.

In March/April of each year, the Land Conservation Department will conduct a Progress Evaluation and Review Meeting(s) with the Land Conservation Committee, DNR Regional Nonpoint Coordinator and Water Resources Field Supervisor and other interested groups, cooperating agencies and units of government. This will provide the opportunity to review and evaluate progress on:

Accomplishments (by Basin and watershed)

- Planned and completed Best Management Practices.
- Planned and achieved pollutant load reductions.
- Information & Education activities

Financial Report (all funds under LCD responsibility)

- Total year end and cumulative payments for BMP installations
- Total funds encumbered in project cost–share agreements under LCD responsibility.
- Total all other funds appropriated for the implementation of the Land and Water Resource Management Plan. This includes applicable staff and other related administrative support costs.

Other Reporting

Annual reports from cooperating agencies and partners will be considered in the reporting process. This will document the roles of the County partners in their role in the implementation of the Land and Water Plan.

Water Resource Monitoring

It is generally agreed that resource monitoring is needed to adequately determine the extent of progress being made toward meeting specific goals and objectives. The Shawano LCD would like to increase what is known about Shawano County's surface and groundwater resources but due to limited funds and a requirement for extensive staff time to properly evaluate water quality changes preclude monitoring each watershed or basin within the County. Shawano County will encourage and rely instead on local volunteers, schools and lake organizations and monitoring that is currently being done on a statewide basis.

The Wis. DNR, the U.S. Geological Survey, and the University of Wisconsin have formed a team of experts to develop and direct evaluation of monitoring activities. It is anticipated that the results from the statewide monitoring program will be available and applicable to the County Land and Water Resource Management Plan. Where environmental problems are identified locally, a more intensive sampling can occur to determine the cause and extent of the problem. This site specific monitoring of targeted areas can be used to develop management plans for corrective action.

I & E Evaluation

Evaluation of the Information and Educational strategies will be completed as it is completed. The number of one-on-one trainings, workshop attendees, and training participants will be tracked. This can directly relate to the number of participants in cost share programing as a result of implementing BMPs. Additionally the number of written articles will be tracked and the dissemination mechanisms.
All of this information will be summarized as part of the Land Conservation Department's annual accomplishment report. The Land Conservation Department, Natural Resources Conservation Service, UW-Extension and Department of Natural Resources will evaluate levels of effectiveness for their respective activities. Adjustments in program delivery will be made accordingly based on the evaluation results.

APPENDIX A: Glossary

303(d) Waters – This list identifies waters that are not meeting water quality standards, including both water quality criteria for specific substances or their designated uses. It is used as the basis for development of Total Maximum Daily Loads (TMDLs) under the provisions of section 303(d)(1)(C) of the Clean Water Act, U.S. Environmental Protection Agency (EPA). The EPA requires that the DNR update its list every 2 years. Also called **List of Impaired Waters**.

Aquatic Invasive Species (AIS): Water dwelling, non-native or introduced species which negatively impact the natural aquatic ecosystem.

Animal Unit (AU): Single animal types or combination of animal types, which are fed, confined, maintained or stabled in an animal feeding operation. Livestock live weight of 1000 pounds is equivalent to one AU.

ATCP 50: The chapter of Wisconsin's Administrative Code that implements the Land and Water Resource Management Program as described in Chapter 92 of the State Statutes. It identifies those conservation practices that may be used to meet performance standards.

Barnyard Runoff Model (BARNY): Excel spreadsheet which computes phosphorus runoff from barnyards in pounds of phosphorous.

Best Management Practices (BMPs) – The most effective conservation practice or combination of conservation practices for reducing nonpoint source pollution to acceptable levels.

Chapter 92 – Portion of Wisconsin Statutes outlining the soil and water conservation, agricultural shoreland management, and animal waste management laws and policies of the State.

Conservation Plan – A record of decisions and intentions made by land users regarding the conservation of the soil, water and related natural resources of a particular unit of land.

Department of Agriculture, Trade and Consumer Protection (DATCP): The state agency responsible for establishing statewide soil and water conservation policies and administering the state's soil and water conservation programs. The DATCP administers state cost-sharing funds for a variety of LCC operations, including support for staff, materials and conservation practices.

Department of Natural Resources (DNR): The state agency responsible for managing state owned lands and protecting public waters. DNR also administers programs to regulate, guide and assist LCCs, LCDs and individual land users in managing land, water, fish and wildlife. The DNR administers state cost-sharing funds for priority watershed project, Targeted Runoff Management (TRM) grants, and Urban Nonpoint Source Construction and Planning grants.

Environmental Protection Agency (EPA) – The agency of the federal government responsible for carrying out the nation's pollution control laws. It provides technical and financial assistance to reduce and control air, water, and land pollution.

Farm Service Agency (FSA): USDA agency that administers agricultural assistance programs including price supports, production controls and conservation cost-sharing.

Geographic Information System (GIS): A computerized system of maps and layers of data about land including soils, land cover, topography, field boundaries, roads and streams. Such geographically based data layers improve the ability to analyze complex data for decision making.

Land and Water Resource Management Plan (LWRM): A locally developed and implemented multi-year strategic plan with an emphasis on partnerships and program integration. The plan includes a resource assessment, identifies the applicable performance standards and related control of pollution from nonpoint sources, identifies a multiyear description of planned activities, establishes a progress tracking system, and describes an approach for coordinating information and implementation programs with other local, state and federal agencies, communities and organization (ATCP 50.12).

Land Conservation Committee (LCC): The portion of county government empowered, by Chapter 92 of the Wisconsin Statutes, to conserve and protect the county's soil, water and related natural resources.

Land Conservation Department (LCD): The department of county government responsible for administering the conservation programs and policies of the Land Conservation Committee, including the Livestock Waste Management Ordinance.

Natural Resources Conservation Service (NRCS): Part of USDA, NRCS provides soil survey, conservation planning and technical assistance to local land users.

Nonpoint Source Pollution (NPS) – Pollution from many small or diffuse urban and rural sources. Livestock waste finding its way into a stream and causing water pollution is an example of non-point source pollution.

NR 151: DNR's administrative code that establishes runoff pollution performance standards for non-agricultural facilities and transportation facilities and performance standards and prohibitions for agricultural facilities and practices designed to meet water quality standards.

Nutrient Management Plan: The Nutrient Management Plan means any of the following:
(a) A plan required under s. ATCP 50.04 (3) or 50.62 (5) (f).
(b) A farm nutrient plan prepared or approved, for a landowner, by a qualified nutrient management planner.

ORW/ERW: DNR classifies streams as Outstanding Resource Waters (ORW) and Exceptional Resource Waters (ERW) as listed in NR 102.10 and NR102.11. ORW waters have excellent water quality and high-quality fisheries and do not receive wastewater discharges. ERW waters have excellent water quality and valued fisheries but may already receive wastewater discharges

Planning, Development & Zoning Department: Department of county involved in setting ordinances and issuing permits for buildings, setbacks, private sewage systems, excavations and other development related activities.

RC&D – Resource Conservation and Development. Shawano County is one of 9 member counties of the Lumberjack RC&D Council located in NE Wisconsin.

RUSLE II: Revised universal soil loss equation- equates various factors to determine erosion rates on cropland.

Soil and Water Resource Management Program (SWRM): DATCP program that provides counties with funds to hire and support Land Conservation Department staff and to assist land users in implementing DATCP conservation programs (ATCP 50).

Soil Loss Tolerance (T): Erosion rate in tons per acre per year at which a soil could maintain productivity.

Soil Survey: NRCS conducts the National Cooperative Soil Survey and publishes soil survey reports. Soils data is designed to evaluate the potential of the soil and management needed for maximum food and fiber production.

Timberland Invasives Partnership (TIP): a partnership between Federal, Tribal, State, County and local government organizations that symbolizes their commitment to work together across jurisdictional boundaries to eliminate invasive species.

Terrestrial Invasive Species (TIS): Land dwelling, non-native or introduced species which negatively impact the terrestrial ecosystem.

United States Department of Agriculture (USDA): Branch of federal government with responsibilities in the areas of food production, inspection and storage. Agencies with resource conservation programs and responsibilities, such as FSA, NRCS, Forest Service and others are agencies of the USDA.

University of Wisconsin-Extension (UWEX): The outreach of the University of Wisconsin system responsible for formal and informal educational programs throughout the state.

Waters of the State: Those portions of Lake Michigan and Lake Superior within the boundaries of Wisconsin, all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, water courses, drainage systems and other surface water or groundwater, natural or artificial, public or private within the state or under its jurisdiction, except those waters which are entirely confined and retained completely upon the property of a person.

Water Quality Management Area (WQMA): means the area within 1,000 feet from the ordinary high water mark of navigable waters that consist of a lake, pond or flowage, except that, for a navigable water that is a glacial pothole lake, the term means the area within 1,000 feet from the high water mark of the lake; the area within 300 feet from the ordinary high water mark of navigable waters that consist of a river or stream; and a site that is susceptible to groundwater contamination, or that has the potential to be a direct conduit for contamination to reach groundwater.

Watershed: The geographic area from which a particular river, stream or water body receives its water supply.

APPENDIX B: Best Management Practice Definitions

Agricultural Sediment Basins. A structure designed to reduce the transport of sediment of other pollutants eroded from agricultural fields to surface waters and wetlands.

Barnyard Abandonment or Relocation. Relocation of an animal lot from a critical site such as a floodway to a suitable site to minimize the amount of pollutants from the lot to surface or groundwater.

Barnyard Runoff Management. Structural measures to redirect surface runoff around the barnyard, and collect, convey or temporarily store runoff from the barnyard.

Cattle Mounds. Cattle mounds are earthen mounds used in conjunction with feeding and dry lot operations and are intended to provide a dry and stable surface area for cattle.

Contour Farming. The farming of sloped land so that all operations from seed bed preparation to harvest are done on the contour.

Contour Strip Cropping. Growing alternating strips of row crops and grasses or legumes on the contour.

Critical Area Stabilization. The planting of suitable vegetation on nonpoint source sites and other treatment necessary to stabilize eroding lands.

Cropland Protection Cover (Green Manure). Cropland protection cover are close-growing grasses, legumes or small grain grown for seasonal soil erosion protection and soil improvement.

Easements. Easements are legally binding restrictions on land titles. Easements are purchased to provide permanent vegetative cover.

Field Diversions. A channel constructed across the slope with a supporting ridge on the lower side, to divert excess water to safe outlet in other areas.

Grade Stabilization Structure. A structure used to reduce the grade in a channel to protect the channel from erosion or to prevent the formation or advance of gullies.

Grassed Waterways. A natural or constructed channel shaped, graded and established with suitable cover as needed to prevent erosion by runoff waters.

High Residue Management. A system which leaves at least 30 percent of the ground covered with crop residue after crops are planted.

Intensive Grazing Management (Rotational Grazing). Intensive grazing management is the division of pastures into multiple cells that receive a short but intensive grazing period followed by a period of recovery of the vegetative cover. Rotational grazing systems can correct existing pasturing practices that result in degradation and should replace the practice of summer dry-lots when this practice results in water quality degradation.

Lake Sediment Treatment. Lake sediment treatment is a chemical, physical, or biological treatment of polluted lake sediments. Sources of pollution to the lake must be controlled prior to treatment of lake sediments. Treatment does not include dredging.

Land Acquisition. The purchase of land or the interest in land which is contributing or will contribute nonpoint source pollution or for the construction of an urban structural practice.

Livestock Exclusion from Woodlots. The exclusion of livestock from woodlots to protect the woodlots from grazing by fencing or other means.

Manure Storage Facility. A structure for the storage of manure for a period of time that is needed to reduce the impact of manure as a nonpoint source of pollution. Livestock operations where this practice applies are those where manure is winter spread on fields that have a high potential for runoff to lakes, streams and groundwater. The facility is needed to store and properly spread manure according to a management plan.

Manure Storage Facility Abandonment. Manure storage system abandonment is the proper abandonment of leaking and improperly sited manure storage systems, including: a system with bottom at or below groundwater level; a system whose pit fills with groundwater; a system whose pit leads into the bedrock; a system which has documented reports of discharging manure into surface or groundwater due to structural failure; and a system where there is evidence of structural failure. The practice includes proper removal and disposal of wastes, liner materials, and saturated soil as well as shaping, filling, and seeding of the area.

Milking Center Waste Control Systems. A milking center waste control system is a piece of equipment, practice or combination of practices installed in a milking center for purposes of reducing the quantity or pollution potential of the wastes.

Nutrient Management. The management and crediting of nutrients from all sources, including legumes, manure, and soil reserves for the application of manure and commercial fertilizers. Management includes the rate, method and timing of the application of all sources of nutrients to minimize the amount of nutrients entering surface and groundwater. This practice includes manure nutrient testing, routine soil testing, and residual nitrogen soil testing.

Pesticide Management. The management of the handling, disposal and application of pesticides including the rate, method and timing of application to minimize the amount of pesticides entering surface and groundwater. This practice includes integrated pest management scouting and planning.

Roofs for Barnyard Runoff Management and Manure Storage Facilities. Roofs for barnyard runoff management and manure storage facilities are a roof and supporting structure constructed specifically to prevent rain and snow from contacting manure.

Shoreline and Streambank Stabilization. The stabilization and protection of stream and lake banks against erosion and the protection of fish habitat and water quality from livestock access.

Shoreline Buffers. A permanently vegetated area immediately adjacent to lakes, streams, channels and wetlands designed and constructed to manage critical nonpoint sources or to filter pollutants from nonpoint sources.

Structural Urban Best Management Practices. These practices are source area measures, transport systems and end-of-pipe measures designed to control stormwater runoff rates, volumes and discharge quality. These practices will reduce the amount of pollutants carried in runoff and flows destructive to stream habitat. These measures include such practices as infiltration trenches, porous pavement, oil water separators, sediment chambers, sand filtration units, grassed swales, infiltration basins and detention/retention basins.

Terraces. A system of ridges and channels with suitable spacing and constructed on the contour with a suitable grade to prevent erosion in the channel.

Waste Storage Facility. A structure for the storage of manure for a period of time that is needed to reduce the impact of manure as a nonpoint source of pollution. Livestock operations where this practice applies are those where manure is winter spread on fields that have a high potential for runoff to lakes, streams and groundwater. The facility is needed to store and properly spread manure according to a management plan.

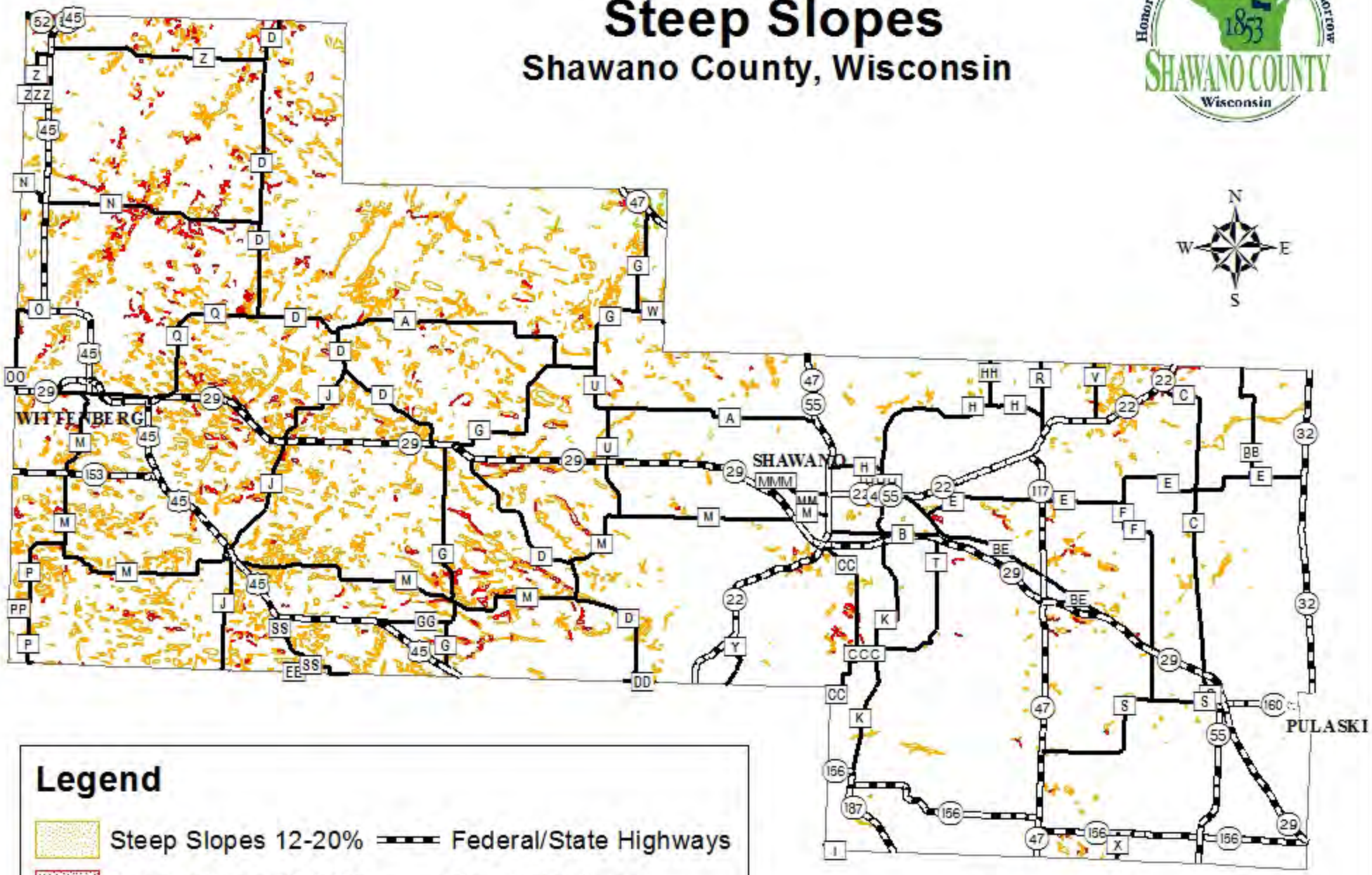
Wetland Restoration. The construction of berms or destruction of the function of tile lines or drainage ditches to create conditions suitable for wetland vegetation.

APPENDIX C: Maps

1) Steep Slopes
2) General Soils
3) Prime Farmland
4) Major Basins
5) Watersheds
6) Surface Water
7) Aquatic Ecosystem Health
8) Vulnerablity
9) Wetlands
10) Woodlands
11) Farmland Preservation

Steep Slopes

Shawano County, Wisconsin



Legend

- Steep Slopes 12-20%
- Steep Slopes 20-35%
- Federal/State Highways
- County Highways

1 inch = 5 miles

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
RESEARCH DIVISION OF THE COLLEGE OF AGRICULTURAL AND LIFE SCIENCES
UNIVERSITY OF WISCONSIN

GENERAL SOIL MAP

SHAWANO COUNTY, WISCONSIN

Scale 1: 253,440

1 0 1 2 3 4 Miles

1 0 1 2 3 4 5 6 Kilometers

N

SOIL LEGEND*

1 — Kennan-Rosholt: Nearly level to very steep, well drained, loamy soils; on uplands

2 — Rosholt-Seelyeville: Nearly level to very steep, well drained and very poorly drained, loamy and mucky soils; on uplands and in depressions

3 — Tilleda-Menominee: Nearly level to moderately steep, well drained, loamy and sandy soils; on uplands

4 — Menahga-Croswell-Mahtomedi: Nearly level to steep, excessively drained and moderately well drained, sandy soils; on uplands

5 — Cormant-Markey-Wainola: Nearly level and gently sloping, somewhat poorly drained to very poorly drained, sandy and mucky soils; on uplands and in upland drainageways and depressions

6 — Shawano-Rousseau-Wainola: Nearly level to moderately steep, excessively drained and moderately well drained and somewhat poorly drained, sandy soils; on uplands

7 — Shiocton-Bach-Iosco: Nearly level and gently sloping, somewhat poorly drained to very poorly drained, silty and sandy soils; on bottom lands, on flats, and in upland depressions

8 — Onaway-Solona: Nearly level to very steep, well drained to somewhat poorly drained, loamy soils; on uplands

*Texture terms in the descriptive headings refer to the surface layer of the major soils in the map units.

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

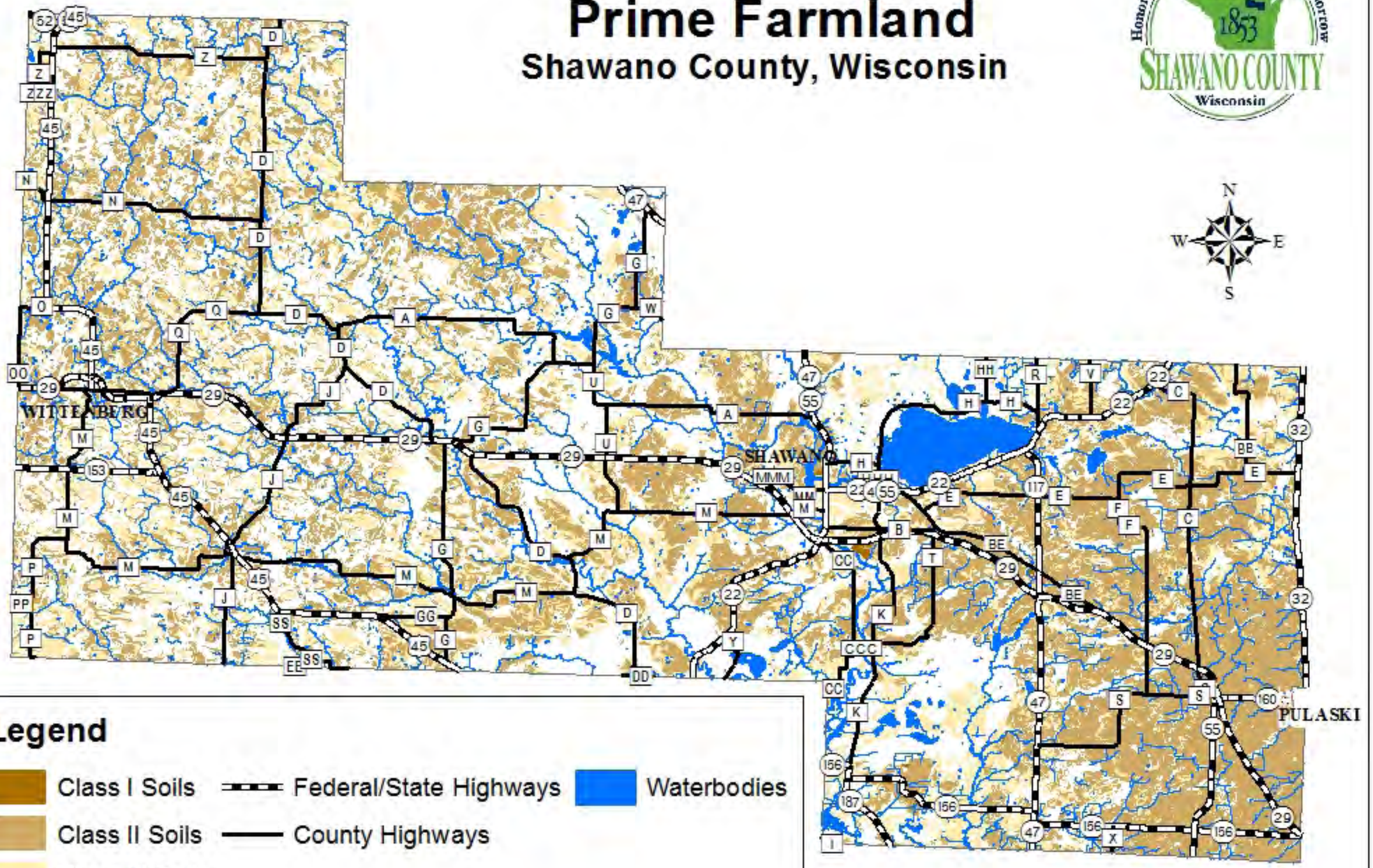
Compiled 1981

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Prime Farmland

Shawano County, Wisconsin



Legend

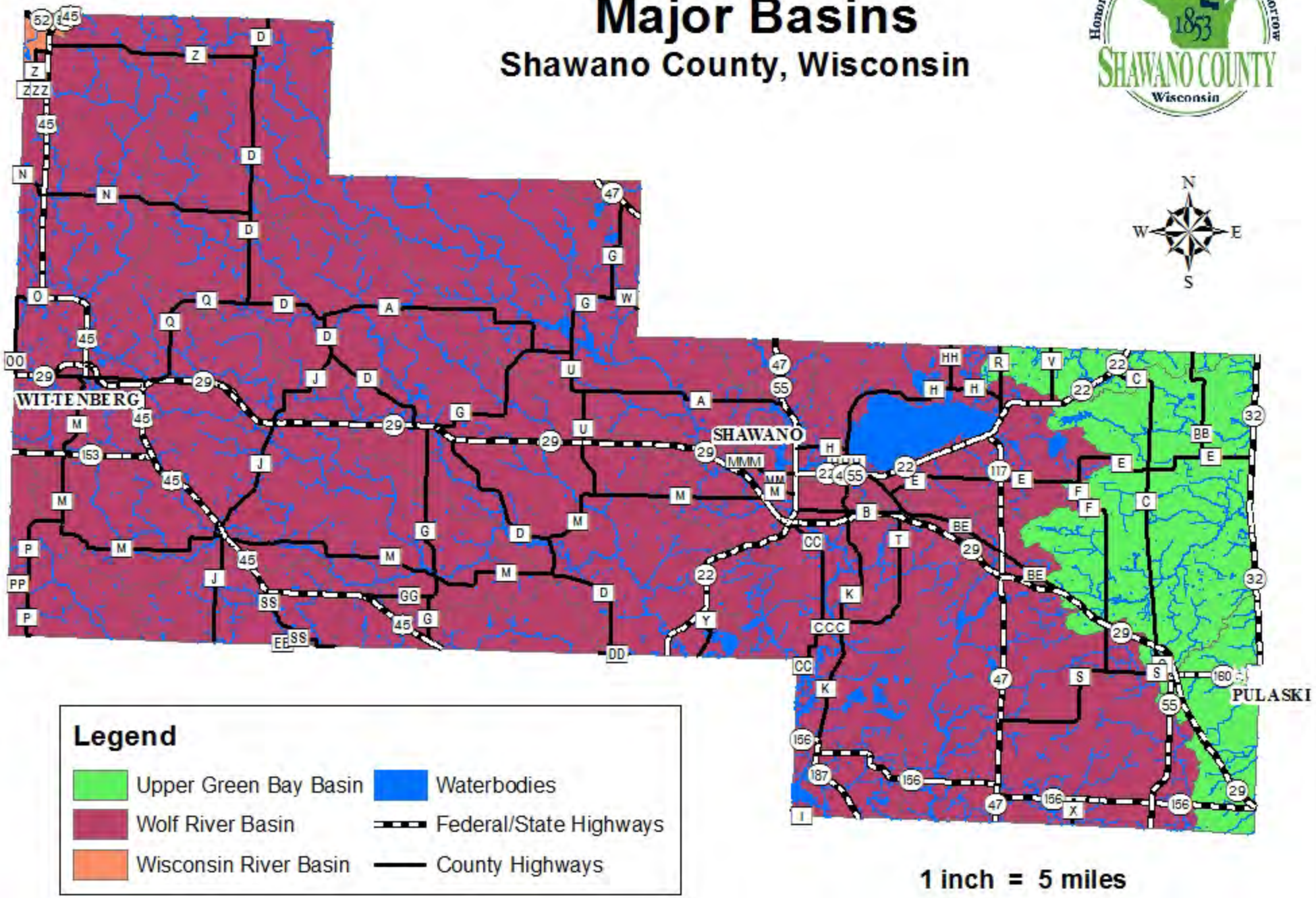
- Class I Soils
- Class II Soils
- Class III Soils
- Federal/State Highways
- County Highways
- Waterbodies

1 inch = 5 miles

*Soil Classifications - Digital Soils Layer created by NRCS. For more information about soils maapping go to http://soils.usda.gov

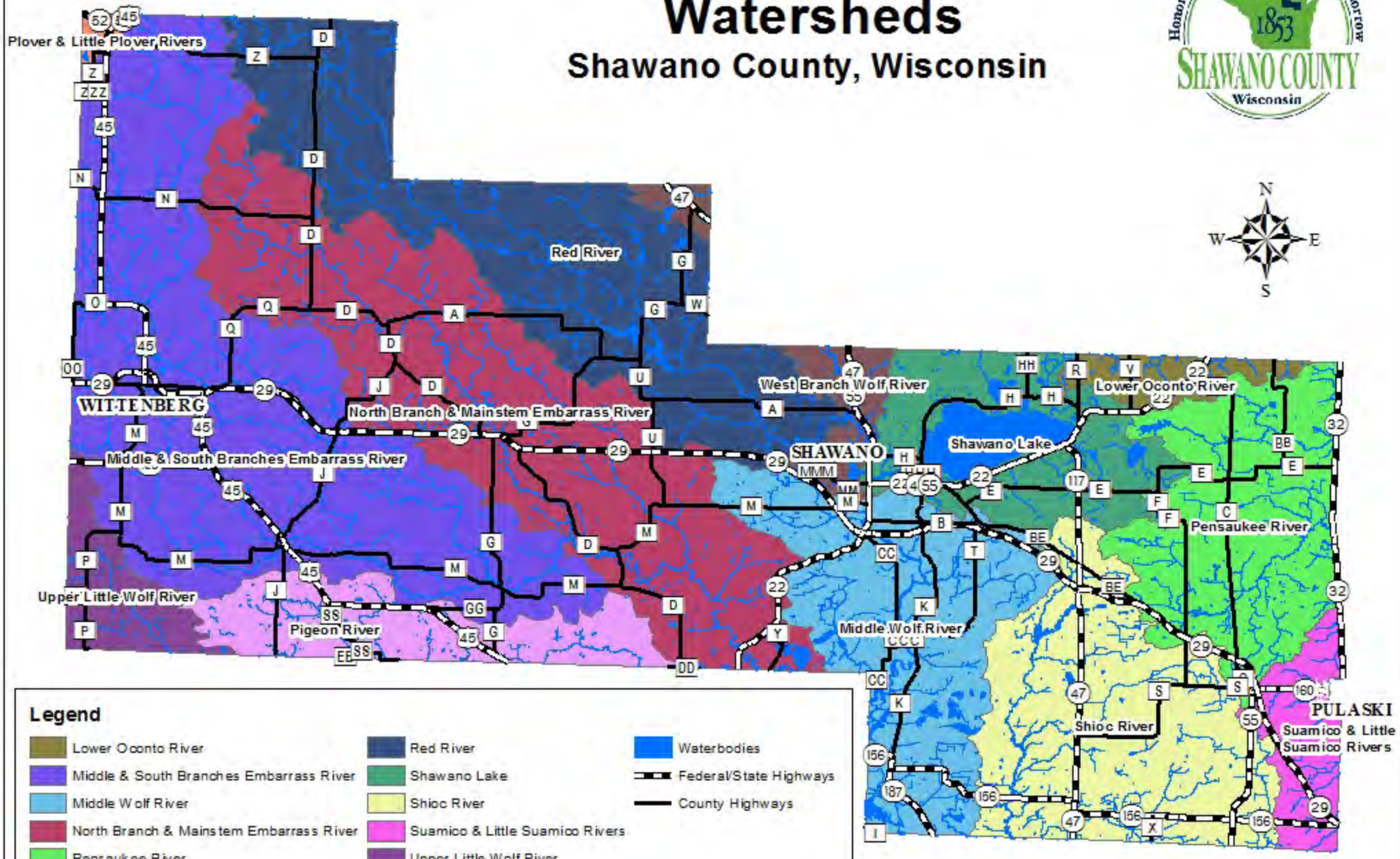
Major Basins

Shawano County, Wisconsin



Watersheds

Shawano County, Wisconsin



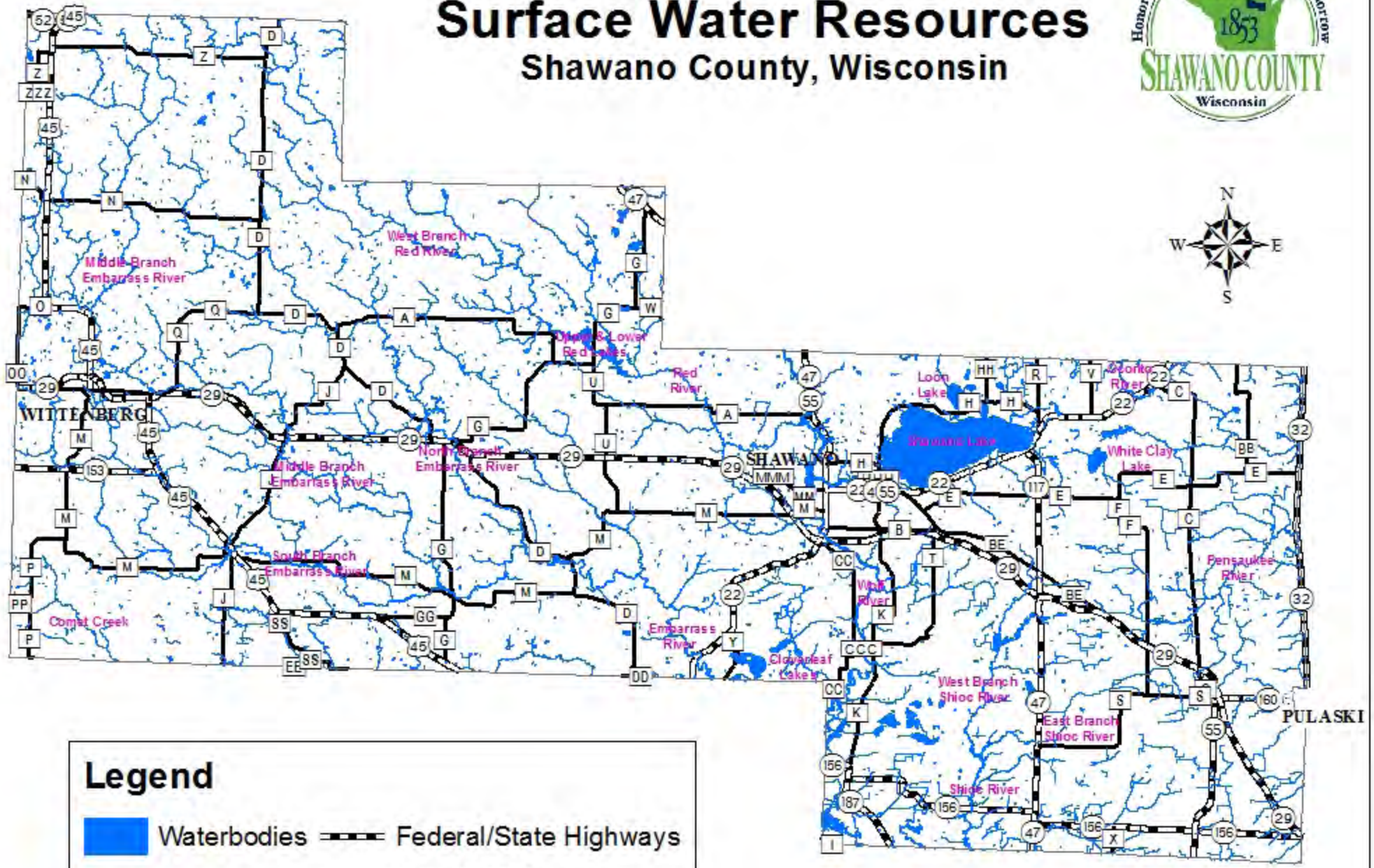
Legend

- Lower Oconto River
- Middle & South Branches Embarrass River
- Middle Wolf River
- North Branch & Mainstem Embarrass River
- Pensaukee River
- Pigeon River
- Plover & Little Plover Rivers
- Red River
- Shawano Lake
- Shioc River
- Suamico & Little Suamico Rivers
- Upper Little Wolf River
- West Branch Wolf River
- Waterbodies
- Federal/State Highways
- County Highways

1 inch = 5 miles

Surface Water Resources

Shawano County, Wisconsin

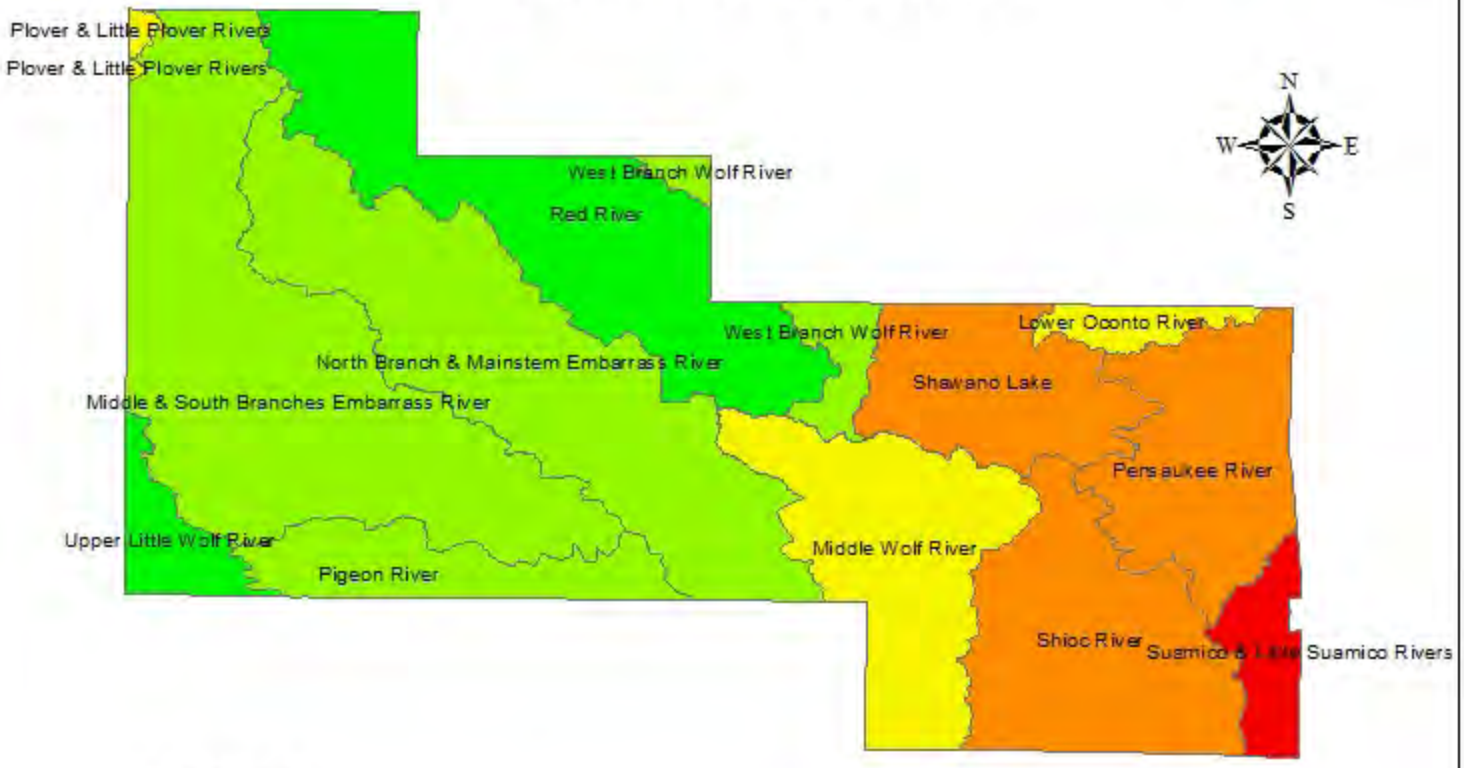


Legend

- Waterbodies
- Federal/State Highways
- County Highways

1 inch = 5 miles

Healthy Watersheds
Aquatic Ecosystem Health
Shawano County, Wisconsin



Legend

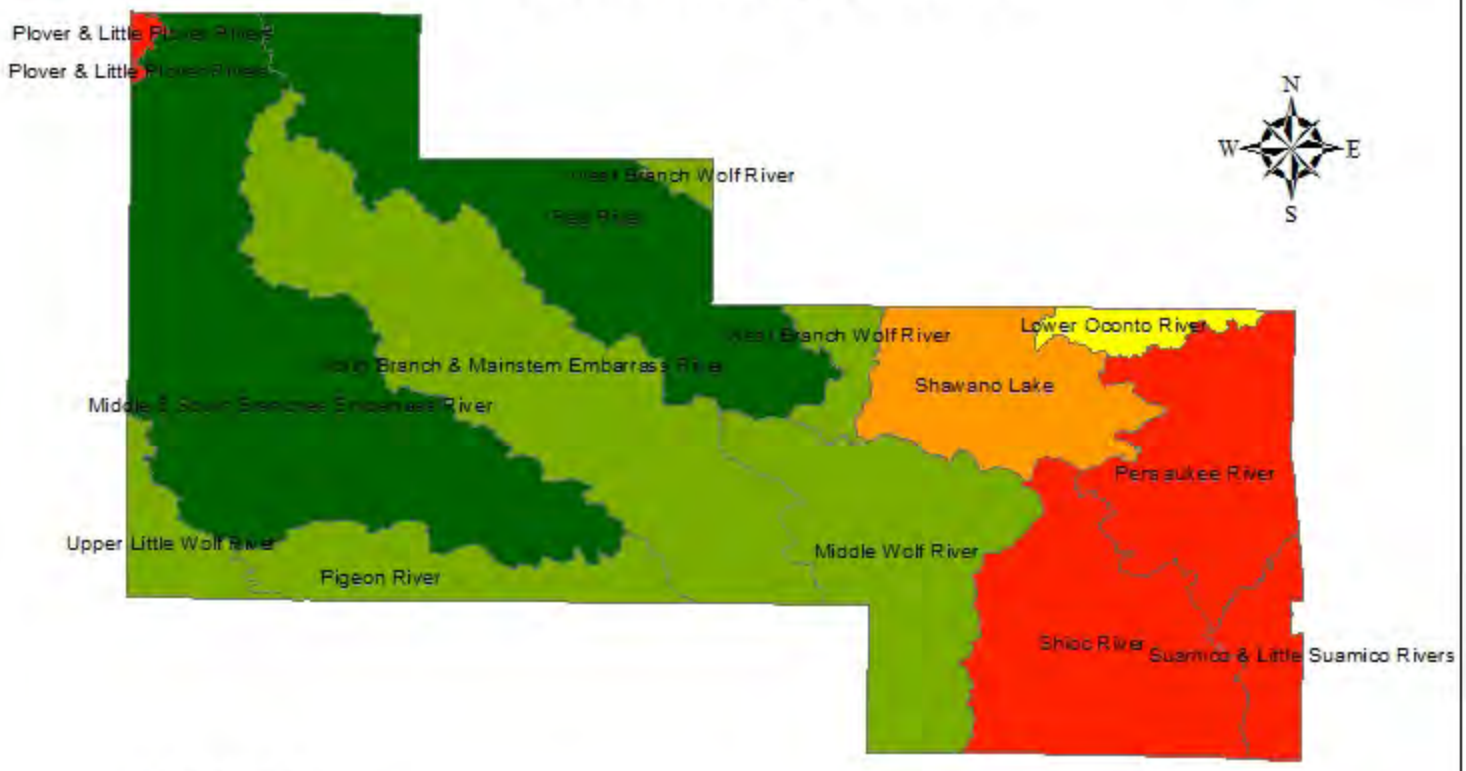
Watersheds-Aquatic Ecosystem H_INDEX

1 - 5	6 - 27	28 - 52	53 - 67	68 - 79

* The higher the index score corresponds to a higher Aquatic Ecosystem Health

Healthy Watersheds Vulnerability

Shawano County, Wisconsin



Legend

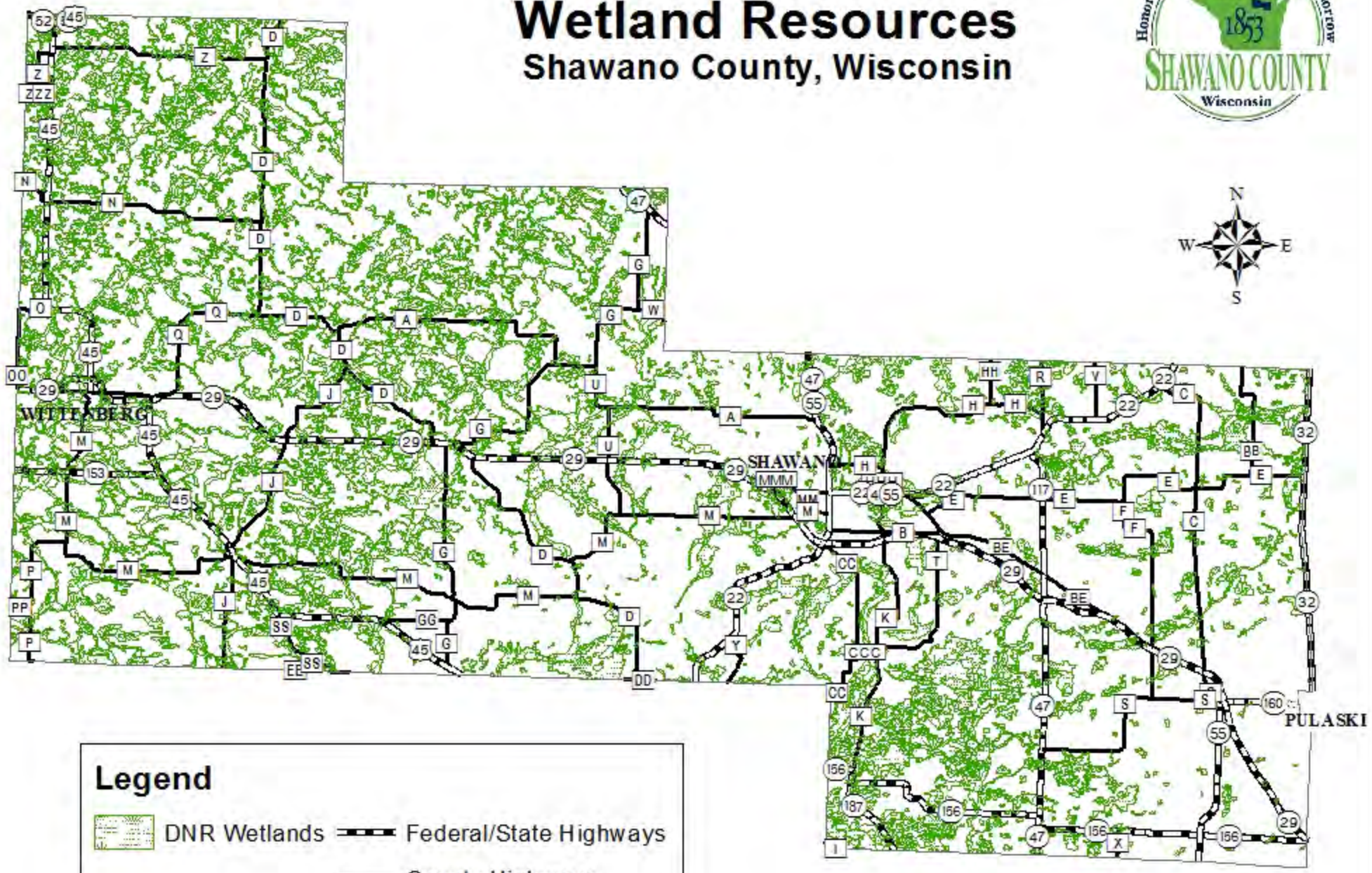
Watersheds - Vulnerability Index V_INDEX

20 - 23	24 - 31	32 - 43	44 - 49
			50 - 68

* The higher the index score corresponds to a higher Vulnerability

Wetland Resources

Shawano County, Wisconsin



Legend

DNR Wetlands

Federal/State Highways

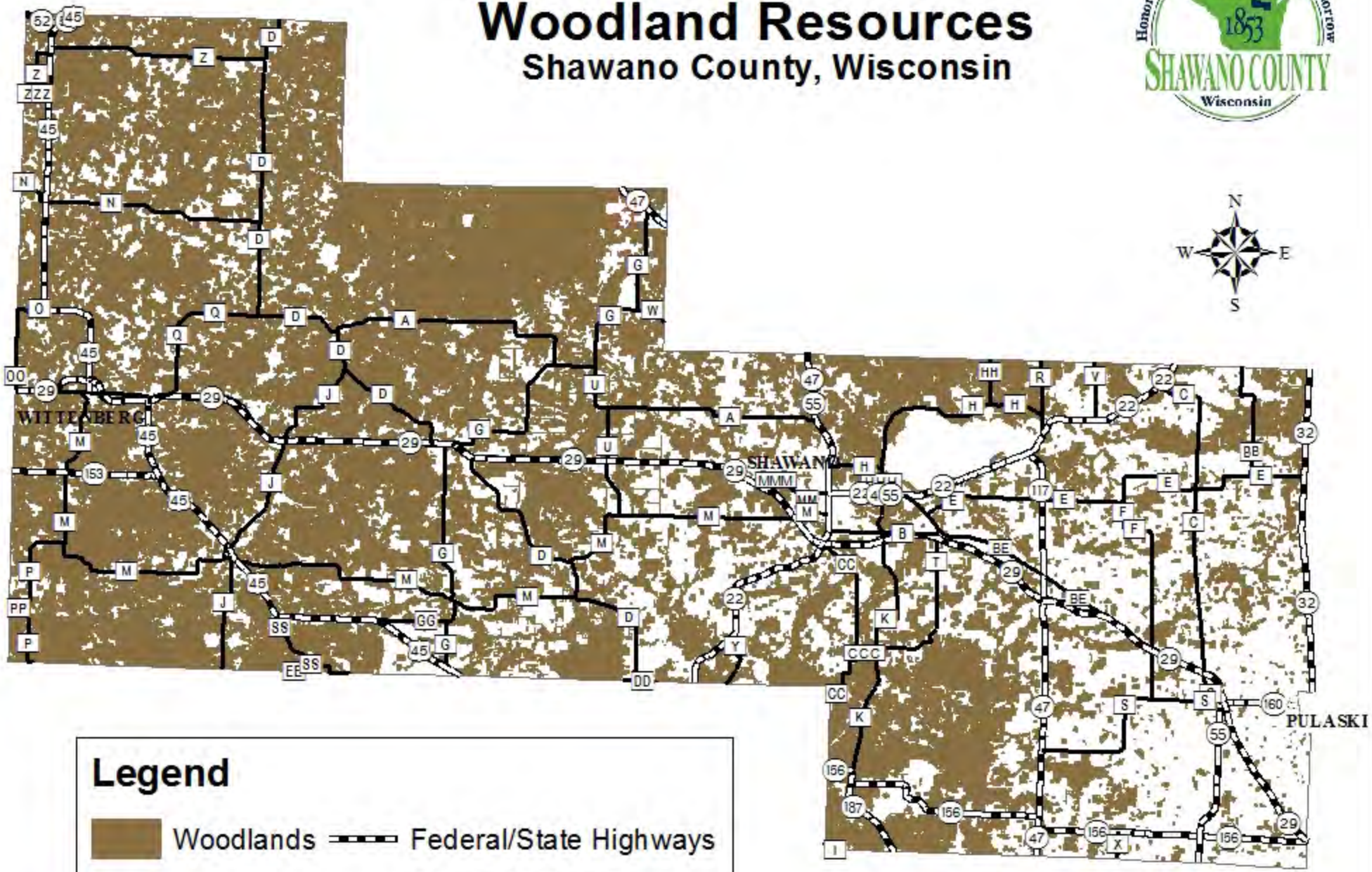
County Highways

1 inch = 5 miles

Woodland Resources

Shawano County, Wisconsin

Honoring Tradition • Discovering Tomorrow
Since 1853
SHAWANO COUNTY
Wisconsin



Legend

Woodlands

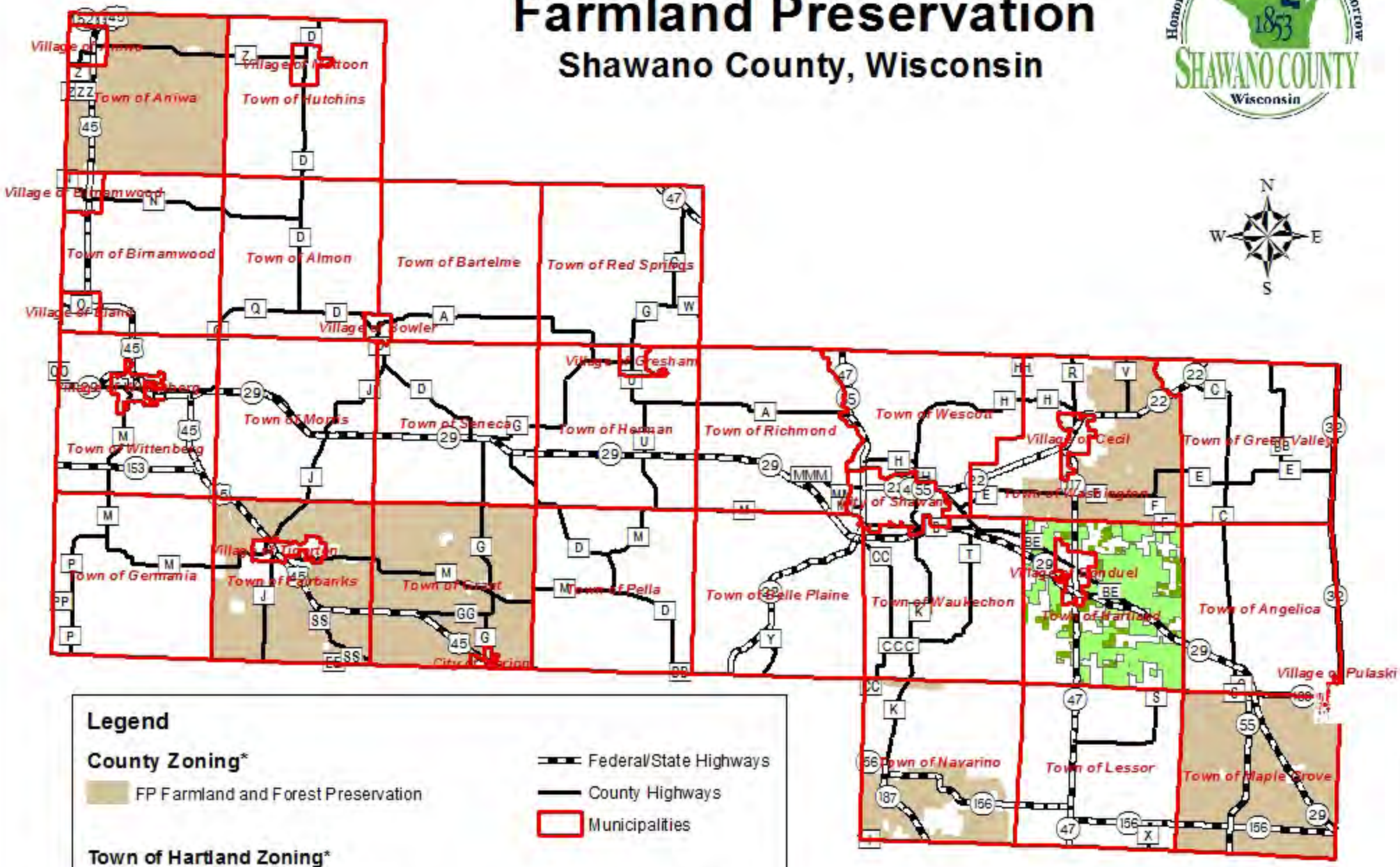
Federal/State Highways

County Highways

1 inch = 5 miles

Farmland Preservation

Shawano County, Wisconsin



Legend

County Zoning*

FP Farmland and Forest Preservation

Federal/State Highways

County Highways

Municipalities

Town of Hartland Zoning*

Farmland and Forest Preservation

Farmland and Forest Preservation Expansion Areas

*Data Coverage Dated Oct. 2014

1 inch = 5 miles

APPENDIX D: Public Hearing Notice

NOTICE OF MEETING
COMMITTEE: LAND CONSERVATION
PUBLIC HEARING NOTICE

311 N. Main Street
Shawano, WI 54166
www.co.shawano.wi.us

DATE: January 7, 2016 **TIME: 9:00 AM**

MEMBERS: **Kathy Luebke, Marvin Klosterman, Robert Krause, Arlyn Tober, Alan Tauchen, Randy Young**

PLACE: **Room A & B, Shawano County Courthouse**

Public Hearing Notice

Notice is hereby given that the Shawano County Land Conservation Committee will hold a public hearing on the Shawano County Land and Water Resource Management Plan on January 7, 2016 at 9:00 AM at the Shawano County Courthouse, 311 N. Main Street, Shawano, WI 54166 in Room A & B. Written and oral comments will be taken at that time. This 10-year plan is a guide for land and water resource management programs and identifies why, how, when and where the Shawano County Land Conservation Department will implement the state Agricultural Performance Standards and Prohibitions.

A copy of the draft plan is available for review at the Land Conservation Department at the Shawano County Courthouse, 311 N. Main Street, Shawano, WI 54166 in Room 3. The plan can also be viewed on the County website homepage http//:www.co.shawano.wi.us/ under “Latest News”.

All interested people are invited to attend said hearing and be heard. Written comments may be sent or submitted to the Shawano County Land Conservation Department, Attn. Scott Frank, 311 N. Main St., Shawano, WI 54166. Written correspondence must bear a legible signature of the author.

ACCOMMODATIONS DUE TO DISABILITY CAN BE MADE BY CALLING (715) 526-6766

NOTICE OF MEETING:
Date: **December 23, 2015** **Time**: **11:00 AM**

Place: **Courthouse, Human Services-Fellman Center, Shawano City-County Library, And Media: Shawano Leader, WTCH Radio Station**

Chief Presiding Officer or his/her designee who posted notice